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# CONVERSATIONS
ABOUT
# HURRICANES

BY THE AUTHOR.

THE

SAILOR'S HORN BOOK

OF STORMS

FOR ALL PARTS OF THE WORLD.

# CONVERSATIONS

ABOUT

# HURRICANES.

CALCUTTA:

PRINTED BY J. THOMAS, BAPTIST MISSION PRESS.

# CONVERSATIONS

ABOUT

# HURRICANES:

FOR THE

USE OF PLAIN SAILORS.

BY

HENRY PIDDINGTON.

PRESIDENT OF MARINE COURTS, CALCUTTA.

> "For that knowledge which is new and foreign from opinions received is to be delivered in another form than that which is agreeable and familiar. * *
> * * * * * * * *
> "and those whose conceits are beyond popular opinions have a double labour; the one to make themselves conceived and the other to prove and demonstrate."
>
> Lord Bacon. *Advancement of Learning.*

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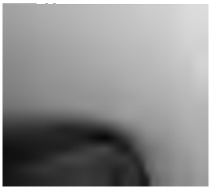

## PERSONS.

**Mr. Helmsley Senior.**—An old Naval Officer.

**Capt. Wrongham.**—An old master of a merchantman.

**Mr. Severn.**—A mate of a merchantman who has just obtained a command.

**George Helmsley.**—Nephew to Mr. Helmsley, a young mate of a merchantman, just out of his apprenticeship.

## CONVERSATIONS.

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# PREFACE.

I SHOULD be thought to exaggerate were I to say how many visits and calls upon my time I have had during the last ten years from Captains and Officers of ships desirous "of a little explanation only," regarding some point or other connected with the Law of Storms; and, as I have elsewhere hinted, only those who, with some education, have lived in early life amongst sailors of all classes, and I may add too, only those who have instructed the grown up, or the young uneducated or half-educated sailor in any scientific matter relative to his profession, can be aware how necessary it often is to set things before his mind in peculiar lights, to enable him quickly and clearly to comprehend them. In sailor language: it is only those who have worked in the old cable tiers that know readily how to take out the kinks and upset the bends.

A gentleman who had passed the whole of his examinations in London, and especially those relative to the Law of Storms, with so much credit that he was asked by the Examiners, "where he had studied the Science?" did me the honour to say that it was mostly by CONVERSATIONS with me that he had perfected his own study of it; and this anecdote he related to me on his arrival in Calcutta, shortly after I had sketched out the plan of this work, in which all the natural or even vulgar objections and difficulties, such as I have heard and heard of, would be met and explained away in a familiar style;

while at the same time a regular course of instruction might be conveyed for the use of those to whom the common didactic form of books in any science often presents so many difficulties. If then my sailor-readers will but fancy they are listening to a mess-table conversation on some subject they do not quite understand, they will fully conceive the design and spirit of this work.

How far I shall succeed in my intention the nautical public will judge. I have only to add that, simple, and strange even, as some of the questions which are put and some of the difficulties which are raised may appear, many of them have been proposed to myself, and I have heard of most of the others from good authority; and as I have thought that a book professing to explain difficulties could not do so in language too plain nor by illustrations too familiar, I have not hesitated to use the plainest language and the most familiar illustrations I could imagine: at the risk, I fear, of being accused by some of explaining that which needed no explanation. This risk I willingly bear for my chance of that share of good which I trust my humble labours may help to bring about; in familiarising the Science of Storms to those in whose hard life this struggle with the winds and the waves so often becomes one of such fearful import.

# CONVERSATIONS ABOUT HURRICANES.

## CONVERSATION I.

### INTRODUCTORY.

**Capt. Wrongham.**—Well, we are come to a pretty pass, I think! Here is my Mate, Severn, who has sailed with me since he was a boy, and is fit to command any ship out of the Port of London to any part of the world (and I would trust her with him without insurance too), and yet he gets turned back for a few days "to study the Law of Storms" as they call it! some precious new-fangled notion that they have got up about manœuvring with West India Hurricanes. I should like to see them at that. You know every thing, Helmsley; do you know any thing about this? Or you, youngster? You are always poking into your uncle's books, what is this new stuff?

**George Helmsley.**—They call it sometimes Cyclonology, Sir, I see.

**Capt. Wrongham.**—Another of those break-jaw names! Can't some of you tell me what it is that poor Severn must study before he goes up again for this confounded examination, without looking so demure and laughing at me?

**Helmsley Senior.**—You are scarcely in a humour to hear an explanation of anything, Wrongham.

**Capt. Wrongham.**—Well I am not. Poor Severn is hurt by being turned back, and so am I that he should be so; for it is a sort of disgrace to be told you do not know anything in your profession; and I love Severn with all my heart, for he is a true sailor and a gentleman too in mind, if he has made his way from the forecastle like myself; and educated himself with my help. And I can't see what right they have to call upon us old sailors to know any new *science*, as they are pleased to call it, especially if one do not believe a word of it, like me. Luckily I have got my certificate before the Act passed, or I suppose they would have turned me back too.

**Helmsley Senior.**—Come! Come! Wrongham, you are too warm about this matter, which after all has been settled by as good seamen, and by far more scientific men than you or I; and you think the examiners have *no right* to examine on such matters, and are thus doing an injustice to deserving men. Some of them are my friends, and I can assure you the whole board are the last men in the world to do that knowingly. Now, if you will be patient, I will show you their *right* in a few words.

**Capt. Wrongham.**—Well, I suppose you will be examining me. Mind I don't like to be turned inside out, with this young scamp here to see and hear it all. I wish Severn was here too to get the benefit of the yarn, if we are to have one. Oh, here he comes! Bring yourself to an anchor, Severn, my boy; and we shall both get a lesson for nothing about this new-fangled science that they have pawled you with. Helmsley has got his talking tacks on board, and your friend young George there, who is just out of his apprenticeship, is to sail with you as third mate, and won't lose any thing by listening, I suppose. Mind, Helmsley, I have been through too many gales and hurricanes to be told there is more than one safe way of managing in them; and that is to heave to. Recollect, Severn, that all the old hands manage that way; so when you have passed in their new science, heave to for all that.

**Helmsley Senior.**—Well, we shall see: I have first to show to you the *right* which my friends, the examiners, have to make this a part of their examination. George, go and bring me Dryden's Virgil.

**Capt. Wrongham.**—What can *he* have to do with it?

**Helmsley Senior.**—You will see by and bye. Here is the passage I want you to look at; Eneid, Book V. l. 32.

> "Not far from hence, if I observed aright
> The southing of the stars and polar light,
> Sicilia lies, whose hospitable shores
> In safety we may reach with struggling oars."

You see this whole passage describes the management of the vessels of Virgil's day *without a compass*, which he must have taken as the copies of those of his Trojan ancestors; and it was some 1300 years or more after this was written that the compass began to be in general use. And then, when men began to go out of sight of land, they little by little found out how to observe the sun, moon and stars, so as to correct by Astronomy the errors of Geometry. To do this they required instruments, and for four hundred and fifty years were groping their way with the Astrolabe, the Cross-staff, and Davis' Quadrant. Yet with these did Drake, and Cavendish, and Dampier find their way round the globe! till Hadley gave the sailors a far superior instrument in the double reflecting quadrant, to which we owe our present beautiful instruments. Then came, within the last century, the general use of Lunars and Chronometers, and that of the Barometer, of which the earliest published record is in 1797.*

CAPT. WRONGHAM.—Well Helmsley, but what *has* all this to do with the right of the examiners to question Severn about their new-fangled Law of Storms?

MR. HELMSLEY.—Why, this, Wrongham; that when you say they have no right to examine you, you mean to say, they have no right to question you about a new science in which you don't believe?

CAPT. W.—Well, I believe that's it.

MR. HELMSLEY.—And do you not suppose that the old Star-Pilots sneered at the Magic Needle-men? as no doubt they may have called those who pretended by the help of a steel needle rubbed with a black stone to find their ports better than the "safe old hands;"—that the clever Cross-staff men attributed any accident which happened to those who used the reflecting quadrant or Mercator's chart to "that new looking-glass jimcrack," or to that "distorted new chart?" And finally, cannot you and I both (I can certainly) recollect the days in the beginning of the present century when Lunars, Chronometers and the use of the Barometer were sneered at by the men who had fought with Rodney, (1780) or Hughes; forgetting or ignorant that Cook had done so much only by the use of the two first? Now every one of these men; and they would not have been true sailors of their "old school" if they had not done it, Wrongham, would, like you, have grumbled at their examiners, if they had had any examination to pass, for questioning them upon the new methods of knowing the ship's true position? And this too the more, that when the Compass was to be the guide instead of the Stars, and the Lunars and Chronometers almost to put the Dead reckoning aside, they were asked to lay by their old methods and take up the new ones. Now, we ask you nothing of the kind, but simply to look at a set of old facts long ago observed, or partially so, but never before brought together so as to work a system or a science out of them.

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* By Capt. Stanley Clarke in the H. C. S. True Briton, see Jour. As. Soc. of Bengal, Vol. XVIII.

**Capt. Wrongham.**—Well I did not think of all that; and I can't say but that the old hands might have grumbled a little.

**Mr. Helmsley.**—Then you must allow, that while the examiners put aside none of the old knowledge, they cannot be greatly to blame if they think the time is come to advance a step in the new; using only what is before every sailor's eyes?

**Capt. Wrongham.**—Ah! but you are wrong there; they do put aside the old knowledge; for they tell us against the old rules, that we must scud sometimes, and heave to sometimes; and that in the same gale. Now both can't be right, and the old rule—

**Mr. Helmsley.**—Stop, Wrongham. What is the old rule founded upon? is there any thing published about it, and with that publication is there any reason assigned for the rule given?

**Capt. Wrongham**—*(after a pause)*. No, I do not recollect that there is, except that in Horsburgh there is a rule given from the Dutch standing orders to their East India fleets, and I think there are some in other Pilots and Directories, but cannot now say where I have seen them. I do not recollect seeing any *reasons* given for these rules, certainly.

**Mr. Helmsley.**—Well, but the men who teach, and believe in, and are guided by the Law of Storms, offer you a demonstration for every thing as plain as a day's work, if you will but study it; and a mass of proof and evidence, direct and collateral, which no fair man can refuse assent to, they say; and copying your own words just now, I must affirm that it is *you* who have *no right* to deny what is so plainly grounded on pure, though very simple, mathematical demonstration.

**Capt. Wrongham.**—I should like to see that proved.

**Mr. Helmsley.**—I think I can prove it to you in a very few lessons if you will take them ; but as the new ship will be soon out of the builder's hands, I must have George, and Mr. Severn, if he likes to come, at the same time. All that I ask is that you stop me the moment you do not understand the words I use, or my demonstration.

**Capt. Wrongham.**—Don't be afraid of that for me.

**Mr. Helmsley.**—No. I know you of old to be a stout disputant; especially where your prejudices are engaged; but though George knows he is always at liberty to ask me questions, yet he might hesitate to do so in company, and Mr. Severn might also feel some reluctance to interrupt me. It was principally for them I spoke, though let me use the privilege of an old friend, Wrongham, to remind you that you yourself might not exactly like to appear slower of apprehension than the youngsters, and sometimes learn a little from their questions.

**Capt. Wrongham.**—Well, that's all agreed; and we will meet to-morrow at ten, if you like.

**Mr. Helmsley.**—Agreed; I shall be ready for you.

## CONVERSATION II.

### MEANING OF THE WORDS.

**Capt. Wrongham.**—Well, now we are all met, let us begin: but first, Helmsley, do tell me why they call this the Law of Storms? I have been thinking of that all night. And then, George here, mentioned some other break-jaw name which ended in 'ology yesterday. You have promised to explain all the words, you know.

**Helmsley Senior.**—Certainly, and I am glad you have mentioned this. Why does the Compass always point towards the North, varying in different parts of the world to as much as nearly 30° ?

**Capt. Wrongham.**—Now, there's a question! can any of you tell? I can't. All I know is that it always does so, and always will do so, I suppose.

**Helmsley Senior.**—*How* do you know that it always does so?

**Capt. Wrongham.**—Why, every boy on board knows what the variation means, and why we take Azimuths and Amplitudes: don't they? That's the way I know it, and every body else knows it: because there have been thousands upon thousands of observations, and Charts of them too.

**George Helmsley.**—Yes, Sir; and in the old times, Halley, I think it was, supposed the Longitude might be ascertained from the variation. I recollect an old passenger-we had in the *Fairy* saying people didn't know how to take Azimuths now-a-days, to ascertain their Longitude by them, which he used to say was very easy *with proper allowances.*

**Helmsley Senior.**—Well, and how is a Compass made Mr. Severn?

**Mr. Severn.**—By rubbing a bar of steel, I think, with a magnet; is it not?

**Helmsley Senior.**—And without that it would not point?

**Mr. Severn.**—No, Sir, I think not; at least, common iron does not.

**Helmsley Senior.**—So then, what you all mean to say is, that first it was observed that a magnetized needle pointed towards the North Star. Then, that this was more carefully observed and found to be always so; and lastly, that it was also observed to vary in different parts of the world, and even that this variation itself altered in the course of time; and that all this has been settled by thousands and millions of observations?

CAPT. WRONGHAM.—Yes, to be sure.

HELMSLEY SENIOR.—Well, then, those facts are some of the *Laws* of the Compass and of its variation, or the Laws of Magnetism; and when we say the LAW of Storms, or any other Law relating to natural objects, such as the LAW of the conducting powers of electric bodies, or the LAW of the Moon's motions, we mean to say that there has been, reasonably, a sufficient amount of observations regarding that particular subject to make us tolerably sure, if it is a new one, and *perfectly certain*, if an old one, that under like circumstances the same causes, whatever they may be, will always go on producing the same effects and happen in the same way.

CAPT. WRONGHAM.—Well; but I used to see also a good deal about Col. Reid's and Mr. Redfield's THEORY of the Law of Storms, also in the papers, though now they talk generally about the LAW of Storms. A theory, I know, means something which is supposed; is this all a supposed matter, or how?

HELMSLEY SENIOR.—I will show you, by and by, that it rests on solid proofs; but just now let us clearly understand the words. George bring my shaving glass, and repeat the trick I caught you at the other day in throwing the reflection of the sun over the road: but not at the windows, if there are girls there, remember. Now, how is it that the reflection moves as you move the glass?

GEORGE H.—You made me learn all about that, Sir. It is because the angle of reflection is always equal to the angle of incidence, that is, to the angle at which the light *falls upon* the glass.

HELMSLEY SENIOR.—Well, now, Wrongham, look at the Sextant there. As long as people who paid attention to such things *supposed* that the angle of the reflection was equal to that of the incidence that was a *Theory*. When they were satisfied that it always did so, and that they could even measure the angle, it became a *Law;* and when Hadley used the reflection to double the angle and thus measure it by a convenient instrument, he applied a known *Law* to a purpose of the highest utility. Do you perfectly understand these words, Mr. Severn.

MR. SEVERN.—Perfectly, Sir. The THEORY is the supposition, and the Law is that supposition proved by clear evidence; so that as I understand it, you claim that the Theory of Storms is now a Law of Storms because of the clear evidence you have of it.

**Helmsley Senior.**—Right: That is the meaning of the words Law of Storms, and this Law is, that it is now proved by a vast mass of evidence that in the Hurricanes of Tropical Countries, and in a vast number of the Gales of Countries without the Tropics, the wind instead of blowing in a straight line, as we all used to suppose ———

**Capt. Wrongham.**—What! do you mean to say that the wind does *not* always blow in a straight line?

**Helmsley Senior.**—Certainly, Wrongham, and you know it; though you have not paid attention to the facts, as you will see; but wait a little; I will show you the proofs by and by. Instead then of the wind's blowing in a straight line, as we used to suppose, it has now been proved that, first, in these cases it blows in circles; or rather in one great whirl more or less circular. And then, that this great whirl of wind is moving forward on certain lines, which are now pretty well known for some parts of the world, and can be calculated for all others by an attentive mariner when the hurricane is coming on; and these lines are called the Tracks.

**Mr. Severn.**—So that the hurricanes may come down upon a ship like a water-spout, Sir?

**George Helmsley.**—Or move away from her? or along with her?

**Capt. Wrongham.**—Yes, but wind isn't water, youngsters; so they are not the same thing.

**Helmsley Senior.**—It is very probable that they arise from the same cause, though; and there is plenty of proof that the water-spout is only the centre of a *wind-spout*.

**Mr. Severn.**—Yes, I recollect, the first voyage I made, seeing a large water-spout in the middle of a fleet of West India-men, and the wind was all round the compass with the ships.

**George Helmsley.**—Yes, and Captain Forrest was telling us the other day, about a water-spout he saw in the Bahamas, which when it reached the shore turned out to be a furious whirlwind, and then, when it got to some water again, looked like a water-spout.

**Mr. Helmsley.**—Well, then, if you watch a dust whirlwind on shore, you will see it do exactly what I have described as the Law (that is the rule for) Storms, i. e. that it whirls round and round, as you may see, and moves onwards.

**Capt. Wrongham.**—Pooh! That's only in calm weather.

**Helmsley Senior.**—In Europe and in cold countries, more generally so; but in hot countries, you may see hundreds and thousands of them moving athwart, and with, and even against a very fresh breeze. You forget that you yourself told me once of a terrific looking waterspout which passed near you when lying to, which was moving partly across the gale.

**Capt. Wrongham.**—Well, I understand; you *suppose* the Hurricanes to be whirlwinds.

**Mr. Helmsley.**—No, we don't *suppose* it at all, now-a-days. It is certainly proved that they are so. Colonel Capper (here is his book*) in the beginning of this century *supposed* it of the Madras Hurricanes, and he was quite right; but his supposition was only a Theory then. We have abundant proof of it; and, more than that, proof that it cannot be otherwise in this particular class of storms.

**Mr. Severn.**—Is there not another name for them, too, Sir? George was telling me of it the other day.

**Helmsley Senior.**—Yes, and a very useful name.

**Capt. Wrongham.**—Oh yes: of use to bother plain folks; nothing else, I suppose.

**Helmsley Senior.**—No, you will soon see that the new name Cyclone is really of use; for this plain reason, that it enables people to understand what they are talking about; which is the use of all names. There are, first, two kinds of winds. The straight-lined or straight winds, like the trades and monsoons, and the circular ones, or those which blow in circles or nearly so, like the hurricanes. Now the old words "gale," "storm," "hurricane," &c. were, and still are by most people, used to express sometimes a particular kind of wind, and at others, only its force. Thus they say, a hurricane in the West Indies, which is a particular kind of wind, and a hurricane (meaning a terrific *squall* of wind, hail, thunder, lightning and rain) which destroyed Lord some one's conservatory, or all the crops in the South of France, &c. Now what is proposed by the author of the new word Cyclone is, that it shall be used to express all winds blowing in circuits, and that the old words should be used to express the *strength* of the wind only. So we say: "The *storm* at Charleston does not seem, though very severe, to have been any part of a Cyclone." "The Mary found by the increasing *gale* and fall of her Barometer that she was already in the outer verge of the Cyclone:" or "The *Daring*, Capt. Headlong, found that the gale soon increased to a hurricane in violence, but her Captain did not even then suspect he was close to the centre of the Cyclone, in which the unfortunate *Blenden Hall* had foundered a few hours before." You see that in all these passages the word Cyclone at once expresses and defines the kind of wind, and being of the same derivations as Cycle it is easily remembered.

---

* Capper on Winds and Monsoons, London, 1801.

Capt. Wrongham.—Yes, it is easy enough if one was satisfied that these circular winds exist. I once had a passenger who was always talking about the Lunar Cycles, but he never could make me understand clearly what he meant to prove about them.

Mr. Helmsley.—The next part of the meaning of the word Law of Storms is, that these whirls of wind (Cyclones, you know, now that we have christened them) whirl, that is turn, differently in the opposite hemispheres; that is to say, in the Northern hemisphere the wind blows round in a direction *against* the hands or hours of a watch, or from right to left, or ↺. And in the Southern hemisphere that they turn *with* the hands of the watch, or ↻, so that the veering of the wind over a fixed point, as an island, &c. will be just the contrary in the one hemisphere to what it is in the other.

Capt. Wrongham.—Well, so far; and till you are ready to talk about the proofs that the hurricanes—or what is that new name?—Cyclones,—do turn as you say, we'll allow that they do so. Next, you say, they move on different tracks.

Helmsley Senior.—Yes. Have you never seen a water-spout form a few miles on the beam or quarter, and keep way with the ship for a time, and even seem to go ahead of her before it broke up?

Capt. Wrongham.—Well, I certainly have seen that often enough; and seen them cross my hawse too.

Helmsley Senior.—You can allow then that if a water-spout, which is really a whirlwind as we have before agreed, and is only some fifty or hundred yards in breadth, can travel along for some three or four miles, that a whirlwind of a hundred miles in diameter might travel much farther, and one of five hundred or more farther still?

**Capt. Wrongham.**—I see no objection to that; but how do you pretend to prove that they *do* travel at all?

**Helmsley Senior.**—We will have a separate conversation about the proofs, and George here and Mr. Severn will set down all that you want to have proved. At present I wish to make you understand the exact meanings of the words we use. Mr. Severn, do you recollect which bank of the Rio de La Plata, Bùenos Ayres stands upon?

**Mr. Severn.**—Upon the port shore, Sir.

**Mr. Helmsley.**—Well but which bank is that?

**Mr. Severn.**—Why—let me see—I used to read in the books of battles and sieges about right and left banks, that must be the left bank.

**George Helmsley.**—No, for it is on the starboard shore when you are going out which would put it on the right bank.

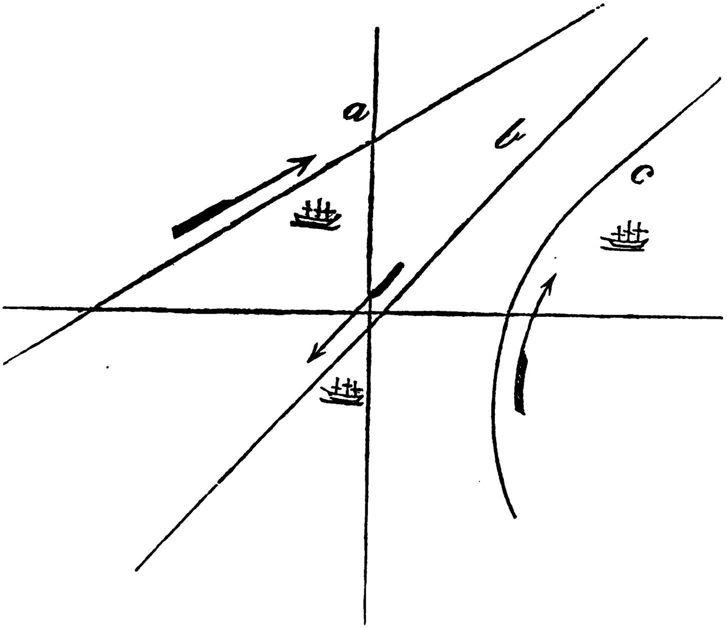
**Capt. Wrongham.**—Oh I recollect that now, for in one of the Directories, Lisbon is said to stand on the right bank of the Tagus, and I once asked a soldier officer, if that was'nt a mistake, for it was always on the port side going in there. I could see he was smiling a little to himself, but he was a very gentlemanly fellow, and explained to me the right bank of a river was the right side of it when you were looking *down its stream;* so Lisbon and Buenos Ayres are both on the right banks of their rivers you see: but what has this to do with the Storm tracks?

**Helmsley Senior.**—A great deal, for we constantly speak of the right and left sides of the tracks of storms; but stop. Do you understand now, Mr. Severn?

**Mr. Severn.**—I think I do, Sir. Gravesend is on the right bank of the Thames.

**George Helmsley.**—Yes! and Tilbury Fort on the left, and so on.

**Helmsley Senior.**—Good, so when you speak of the right and left sides of a storm track, you speak of them as of the banks of a river remember. That is, you suppose yourself looking along the track in the line in which the Cyclone is moving, as you do down the stream of a river, and then the right and left sides of the track are of course on your right and left hands. Here, George, look at this diagram which is part of a Chart, and tell me on which side of the track *a* the little ship is.



**George Helmsley.**—Let me see—. On the right hand side, Sir.

**Helmsley Senior.**—And, Mr. Severn, on which side is the ship near the track *b*.

**Mr. Severn.**—Right side also, Sir. No, stop! the arrow means that the Cyclone is travelling down *from* the N. N. E.—the ship is on the left side I see.

**Helmsley Senior.**—Now, Wrongham, on which side is the ship *c?*

**Capt. Wrongham.**—I thought so, Helmsley, you want to turn me end for end before these youngsters, if I make a blunder, I suppose.

**Helmsley Senior.**—Come! come Wrongham! when you and I sailed together we used often to say to the youngsters when they began to think themselves clever men, "*Never too old to learn.*" We must take the lesson for ourselves now, and practise what we preached then. How do you suppose *I* learned all this which I am explaining to you?

**Capt. Wrongham.**—Oh! things are different with you, for you can take a book and learn by yourself. But never mind, I look upon

Severn and George as my sons, and if I do make a blunder they will say nothing about it. Let me see. What a queer track that is, though!

**Helmsley Senior.**—It is the common curve of the West India hurricanes, I assure you, as you will soon see. Come! on which side is the ship?

**Capt. Wrongham.**—Right hand side of the track.

**Helmsley Senior.**—Now you understand that completely, I hope? Recollect, that though, properly speaking, the whole diameter of the Cyclone, though it be five hundred or a thousand miles broad, forms a track, yet *the* track of which we usually speak and which is represented by the lines laid down on the Charts of Storms is the supposed line made by the centre or focus of the Cyclone.

**Capt. Wrongham.**—Well, but that is also only an imaginary spot, I suppose?

**Helmsley Senior.**—No, it is not at all an imaginary spot, but a real space of calm weather—sometimes even with sunshine!—in the very middle of the most furious hurricanes and Tyfoons, and strange to say, the more furious they are, the more certain is it that we find this calm space to occur.

**Capt. Wrongham.**—Well, but do you mean that there is a calm all along the line of the track? I thought you said just now that the wind blew in Circles?

**Helmsley Senior.**—Have you never observed when looking at a water-spout that it seemed to be hollow in the middle?

**Capt. Wrongham.**—Yes, many times; that is, it looked white like.

**Helmsley Senior.**—Well, can you not fancy that in the middle of the spout there might be a little calm space?

**Capt. Wrongham.**—Why, I *could* fancy such a thing, but the flying fish, or perhaps the sea gulls, would be more likely to give you an answer to that.

**Helmsley Senior.**—That sort of answer has already been given by vast numbers of land and sea birds and insects, which, as I shall detail to you when we come to our proofs, have been found whirled into the calm centres of Cyclones and carried out hundreds of miles to sea; and to come back to your question, these centres are not a calm space *all along* the line of the track, but a calm space in the centre of the whirl of wind forming its focus, which is from five to twenty-five miles or more in diameter, and which moves on with the vortex or whirl, and so may be supposed to trace a line across the ocean; which though we retain it on our Charts to guide the eye, is effaced as the following part of the Cyclone sweeps over the spot.

**Capt. Wrongham.**—Well, I must say that the water-spouts are of great use to you, Helmsley.

**Helmsley Senior.**—They are what Sailors are most familiar with, and you will soon learn that we can trace a series of water and wind-spouts up to the sizes of true hurricanes, or pretty nearly so. We have not done with them yet, too; you have all noticed the mass of water which is as it were boiling along under the water-spouts.

**George Helmsley.**—Oh yes, Sir, I once saw one from aloft just beginning, and it was only just heaving up a little as it were, till the spout came down from the cloud above.

**Helmsley Senior.**—Well, that was a miniature representation of *The Storm Wave*, which is a mass or disk of the sea, raised up sometimes there is no doubt to a great height above the surrounding ocean, and carried forward as the Cyclone moves on; and when it reaches a low shore, or the centre, particularly, passes over a low island in its track, it sweeps over it with a tremendous wave or two, which carry every thing before them and inundate the whole country.

**Capt. Wrongham.**—Well I know that does happen in hurricanes, for I was once chartered to go to Belize to relieve the people there who had suffered in that way.

**Helmsley Senior.**—There are abundant instances and proofs of this, and moreover of ships about whose commanders' reckonings, and their allowances for drift and the like, there could be no manner of doubt, being carried upwards of fifty or even a hundred miles in the 24 hours by this wave.

**Mr. Severn.**—Is that any thing like the harbour rubbish which a water-spout will bring over from one side of a port or basin to the other, Sir? I once saw a canoe turned over and brought close to the shore surf in that way.

**Helmsley Senior.**—It is exactly the same thing as to the effect, and probably as to the cause; but there is another kind of currents also in Cyclones which you must bear in mind, and these are called the STORM CURRENTS.

**Capt. Wrongham.**—I think I know what you are going to tell us now. It is that these **Storm Currents** are just the set of the Currents with the winds? That would make them like our gales of wind, in which one often finds a strong current has set with the gale.

**George Helmsley.**—Or like the whirlpools in a tides-way that carry things round and round so, and give one such a pull in a boat?

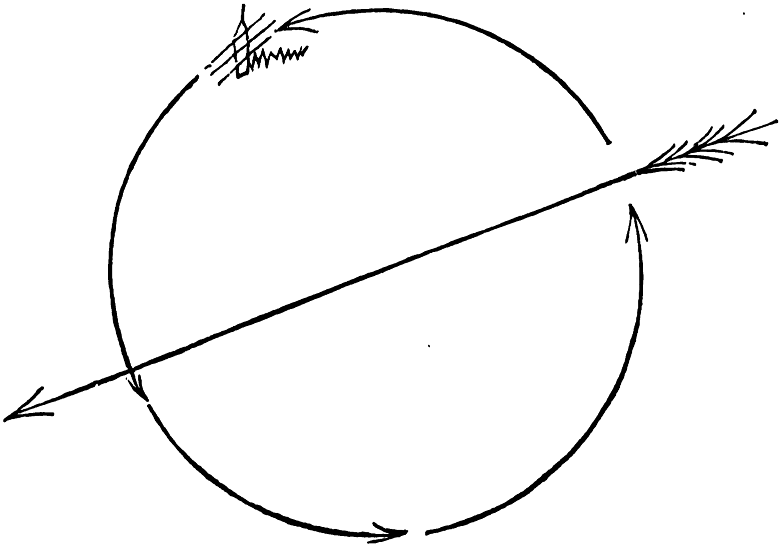
**Helmsley Senior.**—Yes, Storm Currents are currents which are frequently, though not always, found to set round the Compass in a Cyclone, and for which allowance must be made. Near Coasts, for instance, they are often very strong and have no doubt occasioned many wrecks.

**Mr. Severn.**—Then, Sir, in a Cyclone there are two sets of forces acting upon a ship?

**Capt. Wrongham.**—Three, Severn. Her Drift, the Storm Wave, and the Storm Current, but these must sometimes act against each other.

**Helmsley Senior.**—Yes, and sometimes all one way. George! see if you and Mr. Severn can sketch upon the slate a case in which they all act one way.

**Mr. Severn.**—Here is our sketch, Sir. First, we make the body of the Storm travel from the E. N. E. to the W. S. W.; then we put the ship on the right hand side of it, and suppose her hove to.



**Helmsley Senior.**—Very well done; and no doubt if she was near the centre that these three forces would carry her a long way you see.

**Capt. Wrongham.**—Why, yes, that is an ugly set of chances upon a lee shore. That is to say, if you prove that all these things really happen.

**Helmsley Senior.**—All in good time, Wrongham; you can *suppose* a ship hove to in an Easterly gale to the S. S. W. of the Scilly Islands, leaving Cyclones out of the question. What would be the forces acting upon her there during the flood tide?

**Capt. Wrongham.**—Why: she would be drifting to the Westward with the gale; to the Eastward by the Channel tide; and to the Northward by the indraught into St. George's and the British Channels.

**Helmsley Senior.**—Well then the Cyclone forces are the same, only they are temporary, and variable, and we want much more information regarding them than we have. All that we can say at present of them is that they certainly exist, and sometimes in considerable force, so that every careful mariner should be on his guard against them when he is fairly involved in the disk of the Storm.

**Mr. Severn.**—What is the *disk* of the Storm, Sir?

**Helmsley Senior.**—A disk is any flat body, but is usually applied to a circular one. Let me see—the sheave of a block before the groove is cut is a disk; a wafer, or the round table we are sitting at, is a disk.

**George Helmsley.**—Or the truck at the masthead, Sir?

**Helmsley Senior.**—Not exactly a common disk, a truck is usually rounded above and flat below, which would make it like a bull's eye, which is properly a *plano-concave* disk, but the Storm Disk we suppose, to be, for we have no positive proof of it as yet, the whole whirling mass of wind, clouds and rain which like a thick fog bank, may extend over a large space of ocean though not of any great height above it. Thus we suppose the Storm or Cyclone Disks to be not more than from three to ten, or at most fifteen miles high (thick) though it measures hundreds of miles in diameter.

**Capt. Wrongham.**—Well, but I thought you had proofs of every thing you said.

**Helmsley Senior.**—We have undoubted proof of every thing which is *essential;* and we have very good proof of this, which is not at all essential; for what the Sailors want first to know is how to manage their ships in a Cyclone whether it be five or fifty miles in height. Now you have all the words explained except one which we will take up to-morrow.

## CONVERSATION III.

### MAKING A HURRICANE; THE STORM CARDS.

**Helmsley Senior.**—We left off yesterday at the explanation of the Cyclone Disk: now I must show you how to *make* a hurricane.

**Capt. Wrongham.**—Why, Helmsley, you are as bad as that monkey George, who was telling Severn and me to bring our Sou-westers up to the house, for you would make a hurricane for us to-day.

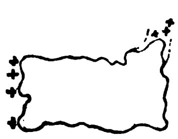
**Helmsley Senior.**—Well, we will try. See, here is a large flat-bottomed cabin tumbler half full of water. Put a little of that black stuff into it.

**Capt. Wrongham.**—Come, no jokes, Helmsley; because we have no time to lose,—but I see it's only black writing-sand. There goes a pinch of it. Do you want any more?

**Helmsley Senior.**—No. Now, Wrougham, stir the water round briskly with the tea-spoon there, and look down upon it. What do you see?

**Capt. Wrongham.**—Why, I see all the little grains running round and round at the bottom of the glass; but at the middle they seem to be quite quiet.

**Helmsley Senior.**—Well, now; suppose that the black grains of sand represent the course of the wind in the Northern Hemisphere, since you have stirred it from left to right. Then put the glass on this old Chart on which I have marked an island.* Put it on the East side of the island so that its edge just touches it. Now, stir the water again. What takes place?



**Capt. Wrongham.**—The same as before, but your island is beneath it.

**Helmsley Senior.**—And supposing the black grains to represent the wind (as white ones pretty nearly do in a sand-storm), how have the people on the island got the wind now?

**Capt. Wrongham.**—Why, North on that Coast.

**Helmsley Senior.**—Move the glass a little farther to the Westward. You see the whole island is covered by that side of the Cyclone, and as it is small the wind is North, or within a trifle of it, all over the island. Now, move the glass so as to bring the centre of it on the centre of the island. How is the wind now with them?

**Capt. Wrongham.**—Why, North on one side and South on the other.

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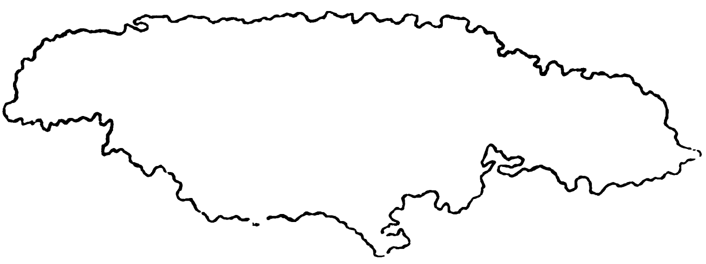
* I have put a small diagram here and for the following examples, but an old Chart is better. It will be understood that the top of the page, like the top of the Chart, is the North.

**Helmsley Senior.**—Place the glass now with its centre about the middle of this larger island, which is Jamaica, and look again. How is the wind Mr. Severn in different parts of the island?



**Mr. Severn.**—East, Sir, on the North Coast; North on the West Coast; South on the East Coast; and West on the South Coast; and so on all round.

**Capt. Wrongham.**—And it is calm in the middle! That's clear enough if things really are so.

**Mr. Severn.**—Do you not recollect, Sir, hearing the people tell stories of the great hurricane in 1780, and you said they were——.

**Capt. Wrongham.**—Well, don't interrupt, Severn. We are to have all the proofs by and bye. This is very pretty cabin-work, but we shall see if it will stand overhauling on the forecastle, you know.

**Helmsley Senior.**—And if you find that, like a well built craft, the more you overhaul it the better it turns out, what will you say then?

**Capt. Wrongham.**—Why, I suppose I must give in: but mind, at present we only allow all this to happen, for you to explain your new-fangled science.

**George Helmsley.**—But I think, Sir, that ————

**Capt. Wrongham.**—Hallo! Who gave you leave to think, youngster? You're not upon pay yet, though you have got a mate's birth. We'll send for the carpenter if we want any thinking done.

**Helmsley Senior.**—Well; let us go on. Now put the glass to the N. E. of the Island, and bring it down to the S. Westward. Mr. Severn.—What takes place now on the little island? (Diagram at p. 18).

**Mr. Severn.**—Why, first they get the wind at N. W.; then as I move the glass along, it is a calm at the centre; and then the little grains move over it from the S. E.

**Helmsley Senior.**—So that they have this time had the wind N. W. then a calm, and then a shift to S. E.

**George Helmsley.**—That is in the Northern Hemisphere, Sir. How would it be in the Southern one?

**Helmsley Senior.**—Try it yourself. Stir the water the other way and bring the glass down from the N. E. as before.

**George Helmsley.**—I see: first a heavy gale at S. E. then a calm, and then a gale from the N. W. [*whispering*]. "Time to get preventer backstays on their cocoa-nut trees, Severn!"

**Helmsley Senior.**—Now keep the water stirred as before for the Southern hemisphere, George, and bring the glass *up* from the S. West over the Island. Observe this, Wrongham; what are the winds?

**Capt. Wrongham.**—N. West first, then calm, and then S. East. Why, that is exactly what Severn had for the Northern hemisphere just now!

**Helmsley Senior.**—Yes, but with the opposite track observe.

**Capt. Wrongham.**—Stop. Let me overhaul that. First, Northern hemisphere—*against* the sun—track from the N. E. Wind N. W. and shifts to S. E. Then Southern hemisphere *with* the sun, but Track from the S. West. Winds and shifts the same. Well, if it is all true, that is what *ought* to happen;—but suppose the centre does not pass over the island or ship?

**Helmsley Senior.**—Try that. Pass the glass up from South to North to the right hand (Eastward) of the island, so as to carry the centre about an inch from it. What is the first wind they get in the Northern hemisphere?

**Capt. Wrongham.**—N. East and then N. N. E. and North and N. N. W. and N. West. Why, Helmsley, those are the very changes of wind we got in the *Mary*, on my first voyage as Captain, in that terrific gale between Bermuda and Sable Island in 1819, when we damaged every thing; but luckily I had you for a passenger; for if it had not been for your good word as a Naval Officer, and a gentleman so perfectly capable of judging, I believe the owners would have turned me adrift; for the old craft was terribly shaken that night, and cost a heap of money for docking and repairing. She never could get back to A, 1, after that. How it *did* blow between N. N. E. and N. N. W.!

**Helmsley Senior.**—Can't you tell why that *ought* to have been so?

**Capt. Wrongham.**—Why, the gale was blowing stronger just then; what else?

**Helmsley Senior.**—Move the glass up again. There, stop, now that the wind is at N. E. you are the whole semi-diameter of the glass from the centre you see. Then move it till you bring the wind to North. How is it now?

**Capt. Wrongham.**—Why the centre is about one-third nearer. Stop, Helmsley, do let me have a Chart of the Atlantic.

**George Helmsley.**—Here's one, Sir, and the case of instruments.

**Capt. Wrongham.**—Well; here we were in the *Mary*, a little to the Westward of a line joining Sable Island and Bermuda in about 38° North. Now let us try it with a mark for the ship. Well it comes out clear enough no doubt; but what has the strength of the wind to do with it, Helmsley? You haven't told us any thing about that yet.

**Helmsley Senior.**—I can't tell you every thing at once, for then I should only be preaching to you, you would say. The strength of the wind was greatest with us when at North and nearest to the centre; because though, as I told you, the wind is blowing in circles or nearly so all over the Cyclone, yet at the outskirt it is only a strong breeze, then a moderate and a strong gale, and close to or at the centre a furious hurricane against which nothing can stand; and the main object of the science is the teaching how to avoid these terrifically mischievous centres.

**Capt. Wrongham.**—Oh, I see; it goes on increasing in strength proportionally.

**Helmsley Senior.**—Much more than proportionally in general; A very few miles of distance more or less when near the centres so augments the force of the wind that it seems to increase at some unknown and almost incredible rate of violence, and this it is which makes the centre, or any near approach to it, so dangerous. But now, Wrongham, as you have got the Chart, put the tumbler on the scale at the side, Mr. Severn will see how many degrees its diameter covers?

**Mr. Severn.**—As nearly as possible five degrees, Sir.

**George Helmsley.**—I understand that, the glass is a Cyclone of three hundred miles in diameter which we have been working with?

**Helmsley Senior.**—Yes: and now we come to the explanation of the Storm Cards. Put by the glass for the present and look at these two Horn Cards,* and observe that the arrows represent the wind or the moving grains of sand in the water. There is one for the Northern hemisphere and one for the South.

**Capt. Wrongham.**—I can't understand these contrivances yet though ———.

**Helmsley Senior.**—Where is the *fleur de lis*, Wrongham?

**Capt. Wrongham.**—I see it, and the four cross lines for the Cardinal points, or for meridians and parallels.

**Helmsley Senior.**—Well, without minding the variation, put it on one of the meridians of the Chart, so that the centre should be where a parallel crosses that Meridian. Bring the glass again, George. Now put the glass *upon* the Horn Card. Which of them is it you have got?

**Mr. Severn.**—The Northern one, Sir.

**Helmsley Senior.**—Then stir the water again from left to right as before and look down. Do you understand it now, Wrongham?

**Capt. Wrongham.**—Oh! yes, perfectly, the words and letters marked on the outer circle are the winds.

**Helmsley Senior.**—Yes, they are called in the new science the Cyclone Points.

**Capt. Wrongham.**—Why not have called them Wind Points at once? How fond they are of new names now-a-days.

**Helmsley Senior.**—You forget that Wind-points, as N. East Wind point for example, would lead you to think, not of that wind as part of a circle, but as a straight-lined wind, blowing from the N. East, like the N. E. trade for instance, while *Cyclone* Point reminds you directly that it is part of a circle only, and lying at a different point of the compass card. The N. E. Cyclone Point of N. E. being at the *compass* point of N. W. in the Northern Hemisphere, and at that of S. E. in the Southern Hemisphere.

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* In the pockets of the covers of this book.

**Mr. Severn.**—That explains to me what I heard an old master of a Mediterranean trader say about the science, when I was at home last voyage, and was enquiring about it. He said it was "some precious new-fangled plan for altering the points of the compass," and we went away so soon that I could not get any book about it to read, and so I went up to be examined without thinking of it.

**Helmsley Senior.**—Here is a table of the Cyclone Points and Compass Points which you will find useful to learn, and it is very easy if you consider that the Cyclone Point is always eight points from the Compass Point, but differing in each hemisphere.

| In the Northern Hemisphere the Cyclone Point of— | Is at the Compass Point of— | In the Southern Hemisphere the Cyclone Point of— |
|---|---|---|
| **East.** | **North.** | **West.** |
| E. b. S. | N. b. E. | W. b. N. |
| E. S. E. | N. N. E. | W. N. W. |
| S. E. b. E. | N. E. b. N. | N. W. b. W. |
| S. E. | N. E. | N. W. |
| S. E. b. S. | N. E. b. E. | N. W. b. N. |
| S. S. E. | E. N. E. | N. N. W. |
| S. b. E. | E. b. N. | N. b. W. |
| **South.** | **East.** | **North.** |
| S. b. W. | E. b. S. | N. b. E. |
| S. S. W. | E. S. E. | N. N. E. |
| S. W. b. S. | S. E. b. E. | N. E. b. N. |
| S. W. | S. E. | N. E. |
| S. W. b. W. | S. E. b. S. | N. E. b. E. |
| W. S. W. | S. S. E. | E. N. E. |
| W. b. S. | S. b. E. | E. b. N. |
| **West.** | **South.** | **East.** |
| W. b. N. | S. b. W. | E. b. S. |
| W. N. W. | S. S. W. | E. S. E. |
| N. W. b. W. | S. W. b. S. | S. E. b. E. |
| N. W. | S. W. | S. E. |
| N. W. b. N. | S. W. b. W. | S. E. b. S. |
| N. N. W. | W. S. W. | S. S. E. |
| N. b. W. | W. b. S. | S. b. E. |
| **North.** | **West.** | **South.** |
| N. b. E. | W. b. N. | S. b. W. |
| N. N. E. | W. N. W. | S. S. W. |
| N. E. b. N. | N. W. b. W. | S. W. b. S. |
| N. E. | N. W. | S. W. |
| N. E. b. E. | N. W. b. N. | S. W. b. W. |
| E. N. E. | N. N. W. | W. S. W. |
| E. b. N. | N. b. W. | W. b. S. |
| **East.** | **North.** | **West.** |

**Capt. Wrongham.**—Well, these Horn Cards are to be used in the place of the tumbler. Is there any particular rule for using them?

**Helmsley Senior.**—Yes, you must always put the *Fleur de lis* on the *Magnetic* meridian, not on the meridian line of the Chart which is the true one you know.

**Capt. Wrongham.**—Why so?

**Helmsley Senior.**—Because you always name your wind by its compass bearing, and the real use of the Horn Cards is, to shew you at all times, by the direction of the wind which is blowing, the *compass* bearing of the centre of the hurricane, which is its dangerous part, and how the wind will veer.

**George Helmsley.**—That's what I was telling you they could do, Severn; but we agreed that we did not exactly see why they wanted to know that: Now listen.

**Helmsley Senior.**—The real use of the Horn Cards is then, as I said, to shew you the bearing of the centre from the ship, and to do that, you have only to know how the wind is at the time. When you know that, you can consider with the Horn Card on the Chart before you, how the wind *will* be; and thence how you can best manage. It puts the whole Cyclone before you as if you had a map of it. How did the gale begin with us that morning, Wrongham? for your gale is a very good example.

**Capt. Wrongham.**—From N. East, sometimes blowing in heavy squalls and sometimes looking as if it meant to clear off; though the Barometer was going down all the while.

**Helmsley Senior.**—Well, place the N. East *Cyclone point* (or Wind point) of the Horn Card over the mark you have made for the ship.

**Capt. Wrongham.**—Well, there it is.

**Helmsley Senior.**—No; you have made a mistake and put the N. E. *Compass* point upon your mark. Observe the words **Wind N. E.** are printed at the N. West Compass point.

**Capt. Wrongham.**—Well, then the people who told Severn you wanted to alter the points of the Compass were not wrong after all.

**Helmsley Senior.**—Yes, they were. Perhaps I can make this plainer to you, Wrongham; look here at this Horn Card, what is upon it?

**Capt. Wrongham.**—Why, only the wind-arrow or Cyclone circles as you call them, but no *letters*.

**Helmsley Senior.**—Place it now on the Chart.

**Capt. Wrongham.**—Well, but how shall I place it? there is nothing to guide one.

**Helmsley Senior.**—Put a *fleur de lis* at the top, or where you like on the Card, since some part of a circle must be towards the North. The opposite point then will be the South, and the right hand the East, and so on.

**Capt. Wrongham.**—Oh, now I see! then you will mark the winds beginning at East (wind) at the Northern point in the Northern hemisphere, and with West (wind) in the Southern hemisphere.

**Helmsley Senior.**—Very right. Place the Horn now upon this little compass.

**Capt. Wrongham.**—I see clearly what you mean. The fact is, that the storm cards are *two compasses placed* one upon the other. That is, a storm compass on the top of a ship's compass or rather a set of wind circles about a common compass, nothing more; and that is what it puzzled me to understand. I say, Severn, if you meet with that fellow again, you can bring him up all standing now if he talks about changing the points of the compass; but come, belay all that; I have got it right now. There's **Wind N. E.** upon the ship's place because the ship *had* the wind at N. E.; that's what you mean.

**Helmsley Senior.**—Good: and now, how does the centre bear from you?

**Capt. Wrongham.**—S. East, of course. Why, Helmsley, if, as you say, the wind *is* so violent at the centre, that accounts for Selkirk in the *Triumph's* being dismasted just about the time the gale began with us, which we could not make out; because when we compared logs he was something about two hundred miles S. E. of us, and yet we had the first of the gale from N. E. Selkirk said too, that he lost his masts by a shift of wind throwing him against the sea, and that he saw an American founder close to him, going down stern foremost!

**Helmsley Senior.**—Well, in that case then, Wrongham, the wind *was* stronger at the centre.

**Capt. Wrongham.**—No doubt of that: Selkirk is a first rate seaman, and when he loses his masts, other folks lose their ships, I can tell you.

**Helmsley Senior.**—Well, then, the centre was bearing S. E. from us at that time, and Selkirk and the poor Yankee were in the middle of it, and we hove to on the starboard tack at nine in the morning. Now move the Card up as you did before, and as the little drift to the Southward will not make much difference in the ship's place for a few hours, see how the wind veered with you. Now you have got it North, how does the centre bear from you?

**Capt. Wrongham.**—East, and much nearer too.

**George Helmsley.**—Was not my father, Sir, in that gale when he was master of the *Pilot* sloop of war?

**Helmsley Senior.**—I think he was, George; go and fetch his log. I think, Wrongham, that was the first day when he said he got an observation? There is the log. No, here it is; it is the same day we speak of as having the wind North at noon, but he was a long way from us, 205 miles to the S. Westward with "squalls from the N. Westward at times and an extraordinary confused sea from the East and N. E." is marked in the log. He did get an indifferent observation that day though, and double altitudes besides.

**Capt. Wrongham.**—But what was that sea from the Eastward?

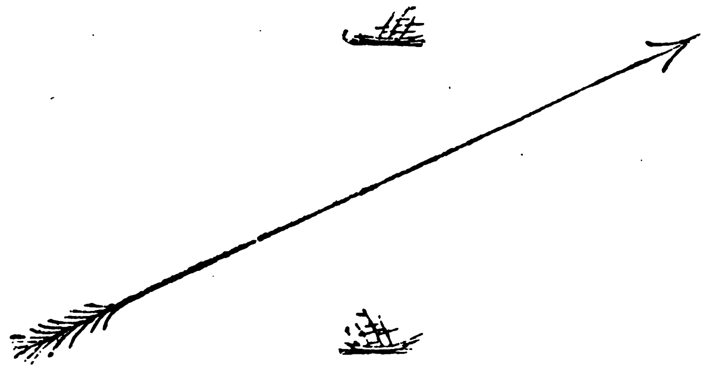
**Helmsley Senior.**—It was no doubt the rearward sea of our Cyclone, as Colonel Reid calls it: we will explain that by and by. I see my brother's Barometer was falling a little also, so that if he had expected a Cyclone and used the Horn Card, it would have told him where the centre laid.

**Mr. Severn.**—I have noticed, Sir, that you say, the wind *turns* in a particular way in Cyclones in the different hemispheres; and then that you say, it *veered* so and so with the ship: and I don't quite understand the difference.

**Helmsley Senior.**—Put the Horn Card or the glass on the Chart again, Mr. Severn, and consider that, as it represents a circle of three hundred miles or more in diameter, whether there might not be a strong gale increasing to a furious hurricane, at the centre all over that space while the surrounding ocean was nothing but calms and squalls?

**George Helmsley.**—Oh yes, Sir. Just as we see the sea boiling beneath a water-spout in the calmest weather: and they say too, the water-spouts can upset or swamp small craft.

**Helmsley Senior.**—Exactly. Now within a Cyclone circle, the wind is all *turning* one way, but here is a piece of paper with two ships marked upon it, say eighty miles from each other, and with a track to the E. N. E. from the W. S. W. which is a very common one in the Atlantic.



Now place the Horn Card to the left and follow the track; that is, carry the centre along the track, and name each of you, George and Mr. Severn, the winds; and you, Wrongham, look out for mistakes. Take the Northern ship, Mr. Severn, as yours. Now, go on, moving the card slowly.

CAPT. WRONGHAM.—You are blundering, George, already; you have got the wrong card. Here's the one for the Northern hemisphere.

| Northern Ship, A. | Southern Ship, B. |
|---|---|
| **MR. SEVERN.** | **GEORGE HELMSLEY.** |
| S. E. b. S. | S. S. W. |
| S. E. | S. W. |
| E. S. E. | W. S. W. |
| East. | West. |
| N. E. | W. N. W. |
| N. N. E. | N. W. |
| N. b. E. | N. N. W. |

Capt. Wrongham.—Well that *is* curious! George's ship has had the wind veering with the sun, and Severn's has had it backing against her. How *is* that, Helmsley?

Helmsley Senior.—Look out of the window at the paddle wheel of that steamer; how does the lower half of it act on the water?

Capt. Wrongham.—Why, it drags the water back, as it were, of course.

Helmsley Senior.—And the upper half, as you know, throws the water forward.

Mr. Severn.—I see, Sir. If we supposed the paddle wheel to lie flat on the water it would represent a water-Cyclone in either hemisphere, according to the way it was moving; and though the whole wheel would *turn* one way, yet the paddles (which represent the winds) would *veer* differently as they passed over any thing.

Helmsley Senior.—Very true, and now use the card for the Southern hemisphere, reversing the track, and see what the changes are. Look out Wrongham!

| Northern Ship, A. | Southern Ship, B. |
|---|---|
| Mr. Severn. | George Helmsley. |
| S. S. W. | S. E. b. S. |
| S. W. | S. E. b. E. |
| West. | East. |
| N. W. | N. E. |
| N. W. b. N. | N. N. E. |

Helmsley Senior.—That is the difference between the words *turning* and *veering* as used by Cyclonists, and do not forget that it is a very essential one.

Capt. Wrongham.—Well, but we have had all the ships hove to as yet, Helmsley. How is it when they scud?

Helmsley Senior.—We will take all that up to-morrow. But I must give you also a few more lessons with single ships, to be sure you understand this perfectly—or you may make the lessons for yourselves. Here are three pairs of Horn Cards, one pair for each of you, and if you remember to use both, and vary the tracks on which you move them, writing down the winds as you find them, and the bearings of the centre, and the shifts when you make the centre pass over your ship or island, you will soon make yourselves perfectly ready to shew any one these *first* uses of the Storm Card; which are to know the bearing of the centre and to account for the shifts of wind; and even to predict them when you know the track of the Cyclone.

**Mr. Severn.**—I read in a number of the Nautical Magazine some time ago about some rule for ascertaining the place of the centre only by standing with your back to the wind, Sir,* but I am sorry to say that I did not pay any great attention to it at the time, being prejudiced against the Law of Storms by what I heard said of it. Do you recollect that rule, and was it a good one?

**Helmsley Senior.**—I do, and it is a very good one. It is as follows:

"Turn your back to the wind, and in the Northern hemisphere hold out the *left* hand, and in the Southern hemisphere the *right* hand, and these will always point to the bearing of the centre."

**Capt. Wrongham.**—Jump up, George, and make a storm-telegraph of yourself directly, to let me see. How is the wind?—N. West—and we are in the Northern hemisphere—and his left hand points N. East of course. Well, that's easy enough, but then one forgets these lefts and rights at my age so soon! If one had them only in a sort of verse like, I can remember such things, but not the dry rules. Master George, you have got the knack of the West India niggers of making rhymes about every thing. Couldn't you make some about that? What are you and Severn whispering and grinning about, I should like to know?

**George Helmsley.**—I *have* been trying to put the rule into rhyme, Sir. Here it is; Severn would not help at all.

"Your back to the wind will the centre define,
If you only consider the place of THE LINE.
For North of it LEFT—or South the RIGHT hand
Stick out like a sign-post—and quietly stand
And each points to the centre whose place you demand."

**Capt. Wrongham.**—Not so bad: write that out for me, youngster, in the first page of my new Log Book recollect.

**Helmsley Senior.**—Here is also a table of the bearings of the centre according to the winds in each hemisphere which it may be useful for you to consider.

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* Naut. Mag. Dec. 1846, p. 651.

| In the Northern Hemisphere when the Wind is— | The centre bears about— | In the Southern Hemisphere when the Wind is— |
|---|---|---|
| **North.** | **East.** | **South.** |
| N. b. E. | E. b. S. | S. b. W. |
| NNE. | ESE. | SSW. |
| NE. b. N. | SE. b. E. | SW .b. S. |
| **NE.** | **SE.** | **SW.** |
| NE. b. E. | SE. b. S. | SW. b. S. |
| ENE. | SSE. | WSW. |
| E. b. N. | S. b. E. | W. b. S. |
| **East.** | **South.** | **West.** |
| E. b. S. | S. b. W. | W. b. N. |
| ESE. | SSW. | WNW. |
| SE. b. E. | SW. b. S. | NW. b. W. |
| **SE.** | **SW.** | **NW.** |
| SE. b. S. | SW. b. W. | NW. b. N. |
| SSE. | WSW. | NNW. |
| S. b. E. | W. b. S. | N. b. W. |
| **South.** | **West.** | **North.** |
| S. b. W. | W. b. N. | N. b. E. |
| SSW. | NNW. | NNE. |
| SW. b. S. | NW. b. W. | NE. b. N. |
| **SW.** | **NW.** | **NE.** |
| SW. b. W. | NW. b. N. | NE. b. E. |
| WSW. | NNW. | ENE. |
| W. b. S. | N. b. W. | E. b. N. |
| **West.** | **North.** | **East.** |
| W. b. N. | N. b. E. | E. b. S. |
| WNW. | NNE. | ESE. |
| NW. b. W. | NE. b. N. | SE. b. E. |
| **NW.** | **NE.** | **SE.** |
| NW. b. N. | NE. b. E. | SE. b. S. |
| NNW. | ENE. | SSE. |
| N. b. W. | E. b. N. | S. b. E. |
| **North.** | **East.** | **South.** |

**Capt. Wrongham.**—It is curious to look at it; but then the points of difference which were mentioned before makes it easily understood.

**Helmsley Senior.**—Before you go, Wrongham, read over this note. In it you will see that I have used all the words we have been talking about with their right meanings.

"The strength of the wind already amounted to a Storm for it now blew a steady Gale, which, but for the falling of the Barometer might have been taken for the trade. The squalls rose at times almost to Hurricane violence; and the Veering of the wind and the ship's run shewed that it was a Cyclone; but as we were yet, as we hoped, on the verge of the Disk only, and the Cyclone Point of N. E. in the Northern hemisphere shewed by the Storm Card the dangerous Centre to be bearing S. East from us, and we were sure, though in so low a latitude as 8° N. that the wind was Turning according to the usual law, and the Tracks of the Cyclones being hereabouts to the North-West, I felt satisfied that I was on the left hand Side of the track."

**Capt. Wrongham.**—Well, that's nearly as good as George's rhymes to make one remember. Copy that also for me George.

## CONVERSATION IV.

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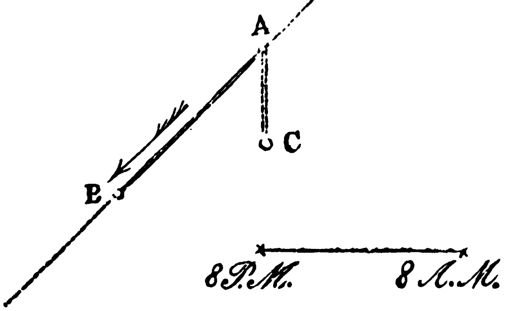
### USES OF THE STORM CARDS CONTINUED.

**Helmsley Senior.**—Well, Wrongham, have you tried the Horn Cards at all?

**Capt. Wrongham.**—I have, and tried them too by some of my old logs and found that they answer pretty well. I think I know how to use them now, but when one looks at the old logs, one is not quite sure that the wind has been set down exactly right.

**Helmsley Senior.**—George and Mr. Severn also, were hard at work last night, puzzling each other where they could. Now, let us take a ship scudding. Here is one which at 8 A. M. has the wind due N. E. in the Southern hemisphere, and that wind is part of this Cyclone track A. B. to the S. W.



Now, George, you are Captain! What's the first thing you do, now that you are satisfied that the weather and your Barometer indicate a Cyclone near you?

**George Helmsley.**—I'll mark off the ship's place first, Sir, and then try to find where the centre lies by the Horn Card.*

**Helmsley Senior.**—Very well; mark the ship's place at 8 A. M.

**George Helmsley.**—The Centre bears N. W. of her, Sir, at A. At what distance shall I put it?

**Helmsley Senior.**—Never mind the distance at first. Suppose the weather is not very heavy yet, and put the ship on the edge of the outer circle; so that calling the whole circle 300 miles in diameter the centre will be about 150 miles from you. Mark *its* place off also at A. Now allow the ship to be scudding nine miles an hour, what will she have made at 8 P. M. her course being due West?†

**George Helmsley.**—108 miles, Sir.

**Helmsley Senior.**—Mark that off; and now put the card on the ship's place again and see how the wind would be.

**George Helmsley.**—East now, Sir, if the centre is at A. still. But you said the Cyclone travels also.

**Mr. Severn.**—I was going to say, Sir—suppose the Cyclone had been travelling as fast as the ship?

**Helmsley Senior.**—Well, let us allow it to have done so; mark that off, George.

**Capt. Wrongham.**—No, give *me* the compasses youngster, here it is, and I put a B. to it.

**Helmsley Senior.**—Now, try with the card how you *ought* to have the wind.

**Capt. Wrongham.**—N. N. E., I see.

**Helmsley Senior.**—And the ship is much closer in upon the centre you observe, and no doubt has a tremendous sea, making it very difficult to steer her, and her Barometer falling very fast. Now, Mr. Severn, what would you do?

**Mr. Severn.**—I should heave to, Sir, that is ———

**Capt. Wrongham.**—Well, Helmsley, that makes good what I say;

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* Use the Horn Cards with this and the succeeding lessons.

† I use the word scudding here rather loosely, but sailors often do so. Perhaps it should be confined to the wind two points on the quarter?

that you should *always* heave to in those hurricanes. We don't want your Storm Cards to teach us that.

**Helmsley Senior.**—Not so fast, Wrongham; you don't see that you might be throwing away a fair wind; you are hardly fair to Mr. Severn, too, in not giving him time to say all he wants to say. Go on, Mr. Severn.

**Mr. Severn.**—I was going to say, Sir, provided it would not take the ship too much out of her course, I might bear up right before it? that is, if there was sea-room; of course.

**Helmsley Senior.**—Very right; and if this occurred in the Southern Indian Ocean when homeward bound from India, Wrongham, you see you would be throwing away a good run with a fair wind if the Cyclone did not carry you too far to the Southward.

**Capt. Wrongham.**—Well I did'nt think of that, I must say. I was thinking as usual of a straight wind from the N. N. E. nothing more. Well, but a ship at the opposite side of the circle or Cyclone, or what do you call it, might make a fair wind *to* India, if bound there by the same reason.

**Helmsley Senior.**—No doubt of that; and it has been done again and again. Now consider the figure again, and suppose the ship to have run as we have said, and to have arrived at the spot marked 8 P. M. but that the wind was East. How would the centre bear, Mr. Severn?

**Mr. Severn.**—North, Sir, which is just about A.; but then it must have been stationary.

**George Helmsley.**—No, it may have moved due South?

**Capt. Wrongham.**—But there's no room for it to come far?—

**Mr. Severn.**—And we do not know if we are to allow it the same rate of travelling as before?

**Helmsley Senior.**—If we did, it would bring the ship into the centre of it. Say that it has travelled at the rate of four miles only per hour; then at 8 P. M. it will have made forty-eight miles due South, which will put it at C. and, as you observe, the run brings the wind to due East.

**Capt. Wrongham.**—Well, but, Helmsley, you make your Cyclones travel at any rate you please.

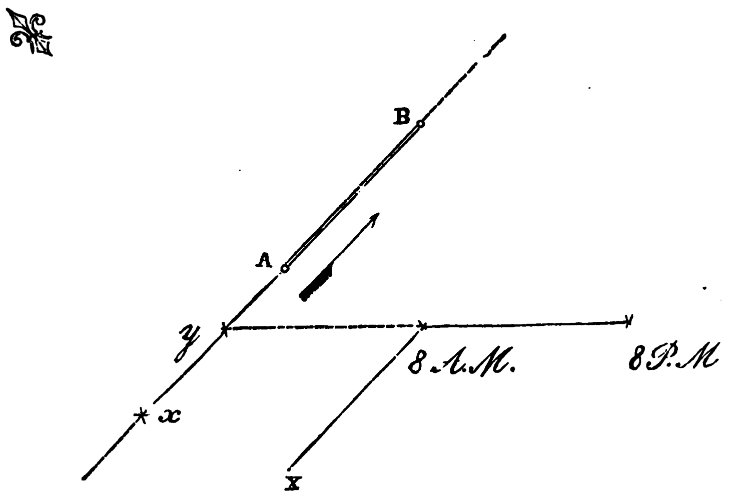
**Helmsley Senior.**—For the sake of example only. They really do travel, and this has been shewn by undoubted evidence, at all rates, from seventeen to two miles per hour, and even up to forty-three miles per hour, as you will find when you look into the works which have been published on the subject: so we may choose in our examples any rate we like for the sake of instruction.

**Capt. Wrongham.**—Well, but that's another thing which likens them to the water-spouts, I think. You sometimes see these quite stationary and sometimes driving along at a great rate.

**George Helmsley.**—As if they had put on all their steam—

**Capt. Wrongham.**—Don't talk to me about steam at sea, I don't want to hear any thing about those precious tea-kettle ships, that are ruining all our best trades; can't you say "as if they had all sail set in a fresh trade?"

**Helmsley Senior.**—Well now, let us take the same figure but change all the conditions of it, that is, let us suppose it in the Northern hemisphere travelling *to* the N. E. and the ship at first nearest to it, at 8 A. M. with the wind at S. S. W.* How will the centre bear, Mr. Severn?



**Mr. Severn.**—W. N. W. Sir, as I see by the Card.

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* Pay no attention to the *fleur de lis* on the left, till it is quoted in the explanation.

**Helmsley Senior.**—Well, mark that off on the track at A. and now suppose that the ship is running, as before, 108 miles to the Eastward to 8 p. m. that is, that for this time she is running off *from* the Cyclone circle while before she was running towards it, and mark it so. Then allow the Cyclone also to have made a run of 108 miles to the N. W. up to B. and how will the ship have the wind now?

**Mr. Severn.**—S. West, Sir, I see.

**Capt. Wrongham.**—Stop though, Helmsley, George is making a dotted line backwards to the West, from the 8 a. m. mark on his pencil sketch, and I see he is thinking, as I am, of where the ship was at 8 p. m. the night before. Try that with the Storm Card, Severn.

**Mr. Severn.**—The Card is scarcely wanted, Sir, for the ship's place ($y$) falls *on* the track $y\ x$, so that she must have had the wind right across it, you see, from S. E.

**Capt. Wrongham.**—Well then, Helmsley, how could she have got to the Eastward from there?

**Helmsley Senior.**—You do not know she *was* there. It was only a fancy of George's, I suppose, to make the line which you noticed. Suppose she had been running up due N. E. from X. at the same rate in the direction of this line, X. to 8 a. m.; how would she have carried the gale all night?

**Capt. Wrongham.**—Let me try. Why S. S. W. all night.

**Helmsley Senior.**—And cannot you suppose that fearful of approaching the centre too near or finding the sea so heavy that getting so close to it might be hazardous work for a merchantman, she hauled out to the Eastward for twelve hours to look for better weather and a higher Barometer.

**Capt. Wrongham.**—Well, that's some of your new school freaks too, going out of your course to look for fine weather. I suppose he had lady passengers on board?

**Helmsley Senior.**—Did not you yourself tell me not long ago, Wrongham, that you always hauled to the Southward if you found the Westerly gales of the Atlantic too heavy in the winter time, and that you always found better weather by so doing?

**Capt. Wrongham.**—Well, I certainly did so; and I learnt it when I was a youngster like George here, from an old passenger Captain we had on board.

**Helmsley Senior.**—Then you also sometimes go out of your course to look for better weather, it seems. Now you do not know evidently that when doing this you were exactly doing, and that very often, what you blamed our supposed Captain for, as one of the new school.

**Capt. Wrongham.**—Well, I should like to see you prove that.

**Helmsley Senior.**—Just take Severn's diagram rather than George's sketch, because it is made to scale, and turn the paper half round so that the track lies East and West, the North being where the *fleur de lis* is put to the left hand. Now look at what the ship has been doing from X. to 8 A. M.

**Capt. Wrongham.**—Here, Master George, help me a bit, for I can see that I'm in a mess by Severn's grinning there; how is the wind now at X. if this track is one due West to East?

**George Helmsley.**—The wind must be W. S. W. Sir, if the centre is at *x*. and the *fleur de lis* the North.

**Capt. Wrongham.**—Well, (keep the *fleur de lis* of the Horn Card parallel with that on the sketch you know) and here am I with the crazy old *Mercator*, in a winter's passage, running East from X. to 8 A. M. and when I get to 8 A. M. I have the wind W. S. W. still, and uglier weather and sea, and haul out S. E. to get better weather for she would not stand it much longer. Well, Helmsley, I cannot say but that you are nearly right, as far as I can see.

**Helmsley Senior.**—You will find, Wrongham, as you go on, that many things which people have done on well known voyages from general experience, are explained now to be perfectly correct and in accordance with the rules of the new science, which together with the Barometer, enables men to do with certainty what they formerly guessed at.

**Capt. Wrongham.**—Well, but if they did it, it was the same thing.

**Helmsley Senior.**—Not so by a great deal, for with these rules and the full knowledge of *why* you are doing it, which is always satisfactory, you have also knowledge of how the wind will veer with you and why it veers so and so if you do anything else. As suppose you dared not, or could not, have run any longer from X. and had hove to, how would the wind have veered with you as the Cyclone past on?

**Capt. Wrongham.**—Why, let me see. From W. S. W. it comes to West and W. N. W. and N. West.

**Helmsley Senior.**—Thereabouts only, for you have not marked the drift she would have made in the 12 hours.

**George Helmsley.**—[*Whispering*]. Ask about the heaving to, Severn.

**Mr. Severn.**—Are there not also, Sir, some rules for heaving to?

**Capt. Wrongham.**—Hallo! So you pretend to teach us how we are to heave to also. We know that, at any rate.

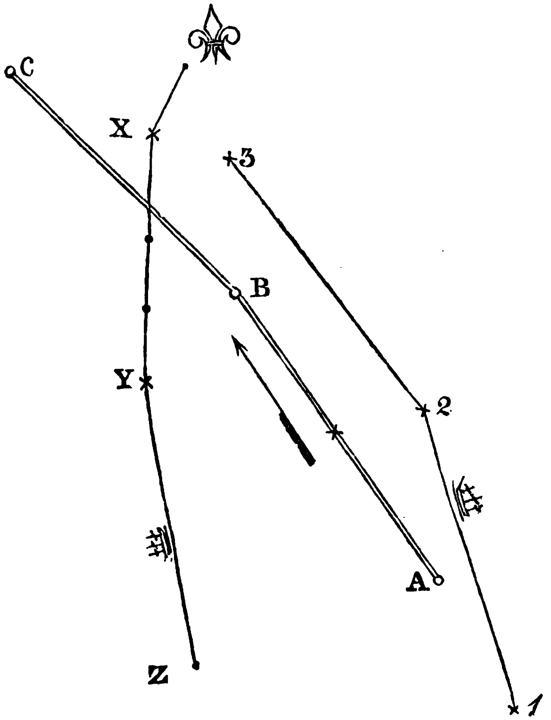
**Helmsley Senior.**—Certainly, Wrongham, no one knows better than you how to heave a ship to, so far as goes to handling her like a seaman; but there are two tacks to heave a ship to upon, and supposing both indifferent to you as regards your ship, and masts, and the state of the sea, would you not be glad of a rule which would insure to you the certainty, that your ship would always come up to the wind and not be subject to breaking off and the chances of being taken aback?

**Capt. Wrongham.**—Well, I can't say but I should, if you will give me some easy rules; for to be headed off in a heavy gale is sometimes bad enough, and taking aback is the d—l to pay; you are sure to lose something between the rudder heel and the jib-boom end, and sometimes get a clean sweep of it.

**Helmsley Senior.**—There is but one single rule, which you have to thank Colonel Reid for, and a very beautiful one it is too, but we must finish what we have to say about the uses of the Storm Cards first.

**Mr. Severn.**—Yes, Sir; you promised to give us some examples of two ships.

**Helmsley Senior.**—Well, let us take a track from the S. Eastward to the N. Westward with two ships, one behind it and the other in front of it. There; I have marked upon this paper, A. for the place of the centre on the first day, B. for the second, and C. for the third, with a double line for the track of the Cyclone; and two ships' tracks 1, 2 and 3 and X. Y. and Z. on each side of it. Now see, Mr. Severn, by the Horn Card, how the ship at No. 1, has got the wind at noon of the day on which the centre is at A.



**Mr. Severn.**—Is there any variation to be allowed for, Sir? You said the Card is to be placed according to the magnetic, not the true meridian. If not, the wind is S. W. b. W. with her.

**Helmsley Senior.**—No, none. Bear in mind that the distance from A. to B. is 120 miles, which allows the Cyclone to have travelled at the rate of five miles an hour. The ship at No. 1, therefore is at fifty miles to the S. E. b. S. of the centre.

**Capt. Wrongham.**—But is not that very close to the centre, Helmsley, where you say it is always blowing so much harder? Steering to the Westward of N. N. W. as she is, with the wind S. W. b. W. is ticklish work for a merchantman, when the sea begins to get heavy.

**Helmsley Senior.**—Very true, Wrongham, but you may consider it a small Cyclone, or you may double or treble our scale and distances if you like. I keep the little sketches we make to about the usual scale of a Chart, because I think you will carry them in mind better, and apply the various lessons more readily, than if you saw them here on a large scale and then had to apply them on a small one.

**Capt. Wrongham.**—Very true, I did not think of that. Well, the ship is at No. 1, and 50′ S. E. b. S. of the centre, what next? She is running up to the N. N. W. also I see, and you tell us that the what d'ye call it (your new name for a hurricane) is travelling up at the rate of 120 miles in the 24 hours. How would they be at midnight, Severn?

**George Helmsley.**—We do not know at what rate the ship is running up yet, Sir.

**Helmsley Senior.**—Say 9 knots, as she is a merchantman, and mark a little cross on the track, Mr. Severn, if you please, at the place of the *centre* at midnight, (sixty miles for the 12 hours) and one for the *ship's* place also at 2, (108 miles for the 12 hours). Now, how has she the wind at midnight?

**Capt. Wrongham.**—S. b. E. I see. Come, she will soon have to keep away, if the wind hauls much more to the Eastward with her.

**Helmsley Senior.**—In the next 12 hours the ship's position is at 3, which as Captain Wrongham says, will show her to have kept away as the wind hauls to the Eastward with her. Now, Wrongham, how has she got the wind? and at what distance is she from the centre?

**Capt. Wrongham.**—The wind is East as one can see easily, the centre B. being South of her; and she is now about as far North as she was before South of the centre; measure it, Severn.

**Mr. Severn.**—Forty-five miles, Sir.

**Helmsley Senior.**—Very well; now look at the position she is in if the Cyclone track should haul farther to the North.

**Capt. Wrongham.**—Very true. He must scud for it, still, for it would be coming right down upon him.

**Helmsley Senior.**—And suppose he could scud no longer, through any accident, or from the heavy sea, and that he had a lee-shore or shoals to the Westward of him?

**Capt. Wrongham.**—Whew! I did'nt think about that. Well then he must heave to, and run the risk, for he cannot scud on to a lee-shore that's clear.

**George Helmsley.**—And, even as you have laid down the track, if he scud right before it, or nearly so, he will be in the centre or close upon it.

**Mr. Severn.**—No, not quite, George, he has got about forty miles to run, due East, before he crosses the line of the track, and he will do that in four hours and a half, and the Cyclone has got fifty-five miles to run which will take *it* eleven hours; but it might alter its rate too I suppose? so it will be close work always for him.

**Helmsley Senior.**—Yes, they frequently do alter their rates, and it *is* always hazardous work to cross in front of them when close.

**Capt. Wrongham.**—Well, but Helmsley; I have been thinking this is like our privateer-dodging in the war-time when we lost the convoy or gave him the slip to get first to market. We used just to do this; douse lights at night and let the stranger over-run you, or carry on and cross his hawse in a dark night.

**Helmsley Senior.**—You will find, Wrongham, as it goes on, that it resembles privateering or pirate-chasing still more than you yet think.

**Capt. Wrongham.**—That's as you make it out here on shore; theoretically, I think they call it.

**Helmsley Senior.**—Not at all, Wrongham; remember that it is something now long past Theory and is a Law, that is a proved rule and order of events.

**Capt. Wrongham.**—Well, we shall see your proofs by and bye. Now; are we to carry this unlucky ship into any farther trouble, or how? You said we were to have a lesson with two ships.

**Helmsley Senior.**—No. We will leave the first ship and take the other one's track to the Southward, which you see I have marked X. Y. and Z. and we will allow that after some baffling, he began to expect the Cyclone fairly at X. which was then at A. and he might do this though the distance is considerable, with a good Barometer and close attention to the weather. Now, how had he the wind and how far was the centre from him, George?

**George Helmsley.**—He had the wind about N. E. b. East, Sir, and the centre is about 175 miles distant.

**Capt. Wrongham.**—Well, and he is steering South, I see. That looks as if he was running down to it. No, not quite. How does the centre bear? Stop, let me try the table. I see; S. E. b. S., but still it is coming up to the Westward of North. Now, how will he know that, Severn? Can you make out?

**Mr. Severn.**—By the veering of the wind, Sir, I suppose, for as he runs down and the Cyclone comes up it must change.

**Capt. Wrongham.**—Very true. Let me try that with the Horn Card as we did before. Stop, let us put dots for 6 P. M., 9 P. M., and midnight. What rate is he going at?

**George Helmsley.**—I measured the distance, Sir, from X. to Y. which is eighty-five miles, that is, about 7 knots an hour.

**Mr. Severn.**—But then did he run at the same rate throughout? for he must have had more wind towards midnight?

**Helmsley Senior.**—Certainly; that is quite correct, take 6 knots per hour, for the first six hours, Wrongham, and 8 knots with the odd one in the remainder, for the last six hours; that will give a more probable average.

**Capt. Wrongham.**—Well, here you are: thirty-six miles to the first dot for 6 P. M., and twenty-four more to the second at 9 P. M., and Y at twenty-five miles, stands for midnight, making eighty-five in all. Now for the Card, Severn, though I can see by the eye that at midnight he must already have brought the wind to N. b. E. How many points is that, youngster?

**George Helmsley.**—Four points, Sir, from the N. E. b. E. of noon; which is what you wish to know, I suppose?

**Capt. Wrongham.**—Yes, four points (your confounded wind compass puzzles one so, Helmsley). So he got the wind veering four points in the 12 hours. What next?

**Helmsley Senior.**—And at what distance is he from the centre now, George?

**George Helmsley.**—Sixty-five miles, Sir.

**Helmsley Senior.**—And take notice, that now the ship and centre are nearly opposite, they are flying past each other like two ships with a beaming wind on opposite tacks.

**Mr. Severn.**—I was thinking of that, Sir. If the Cyclone is going 5 knots and the ship 8 or 9, they must be passing each other at the rate of 13 or 14 knots per hour! But then the wind must veer very rapidly with the ship as she runs on.

**George Helmsley.**—So it does, Severn, see here I have been trying it. Putting the centre only a very little beyond the X. and the ship but a very little way down on her track, it brings the wind to N. b. W. or N. N. W. directly.

**Capt. Wrongham.**—Let's see. So it does; and that is the reason why he alters his course to the Eastward of South, I suppose, for it would soon get to be N. W. with him.

**Mr. Severn.**—Yes, and that just about the time it was S. E. with the other ship too.

**Helmsley Senior.**—And observe, moreover, that the one ship is running *into* danger and the other *out* of it.

**George Helmsley.**—I suppose one of the Captains knew what he was about, Sir, and the other did not?

**Capt. Wrongham.**—Not so fast, youngster; wait till you are a Captain yourself. After all we have been only making ships' tracks and *supposing* winds for them.

**Helmsley Senior.**—For the present, Wrongham. What if I shewed you the logs of these two ships?*

**Capt. Wrongham.**—Well, I'll wait for that; but how did the Captain of this last ship know which way the Cyclone was coming?

**Helmsley Senior.**—We will explain that too by and bye, when we get to the calculations of the tracks. But it is getting late and I have an appointment. I think you now fully understand the use of the Horn Cards, but remember you cannot exercise your mind too much in the way of thinking of them, and of ships in various positions and with various winds till you are perfectly familiar with the notion of winds blowing in a circle. With a pencil or a bit of chalk you can always check yourself, so as to be sure you are right.

**Mr. Severn.**—Yes, indeed, Sir, it will be our own fault if we don't understand it. They shan't turn me back again if I can help it.

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* This *is* an actual case as will be detailed in the conversation on the proofs.

# CONVERSATION V.

## Ascertaining the Tracks of Cyclones.

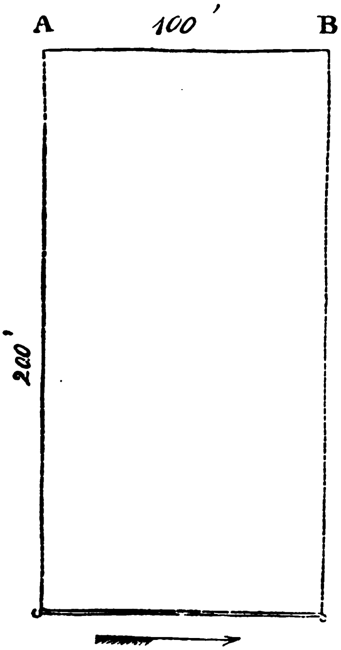
**Helmsley Senior.**—Well, Wrongham, I think your difficulty is to know how the tracks of the Cyclones are ascertained?

**Capt. Wrongham.**—No, not exactly that, when there are a number of ships as I see in the Charts to Col. Reid's book, and in Mr. Redfield's papers, I can understand that then the centres are ascertained for every day, and the track laid down by them from centre to centre. What puzzles me is to know properly how a single ship is to calculate the track when the Cyclone is coming on, if she has not got it laid down on the Chart.

**Helmsley Senior.**—Take it as a safe rule, Wrongham, that you ought always to calculate the track roughly, though you feel certain that it is on the Chart, and an usual one, because no two Cyclones perhaps follow *exactly* the same track, and a ship in some position may be approaching nearer than is safe to the centre if this is not very carefully attended to. Let us begin. Make a mark, Mr. Severn, at A. for a ship's place, and let us say that she has the wind West in the Southern hemisphere. How does the centre bear then, George?

**George Helmsley.**—South, Sir, of course; shall I mark it?

**Helmsley Senior.**—Yes; and we will say that the distance from the outer circle to the centre this time is two hundred miles. Now let us allow that the ship A. runs a hundred miles due East in ten hours, to B. (lay



that off on the sketch, George) and has still the wind at due West. How does the centre bear now, Wrongham?

**Capt. Wrongham.**—Why, South as before, certainly.

**Helmsley Senior.**—Well, then we have got two bearings of "the enemy" at a hundred miles distant from each other. How has he too been steering, Mr. Severn?

**Mr. Severn.**—The same course as ourselves, Sir; that is, if we are sure of the distances, for it may have been sheering in upon us by running up E. N. E. or N. East and be much closer and ————

**Capt. Wrongham.**—Yes, come Helmsley, how can you tell that? That's a clincher after all, for it must be impossible by your own rules —Eh, George?

**Helmsley Senior.**—Gently Wrongham. The wind is still at the same point and the bearing of the centre is therefore still the same, but do you recollect that I told you also that the wind is always much more violent near the centre?

**Capt. Wrongham.**—So you guess, at its being a little nearer by the gale being heavier, eh?

**Helmsley Senior.**—*(smiling.)* No, we merely say—theoretically as it were, Wrongham,—that we think it *therefore* probable that the centre is nearing us, and then, Mr. Severn, what would you propose, or do?

**Mr. Severn.**—I think, Sir, I would take a look————

**Capt. Wrongham.**—Oh yes! at the Barometer and the Sympiesometer, that's of course; but you didn't say they had anything to do with it though, Helmsley,—that's not fair. What's that you are peeping at there, master George, and shewing to Severn?

**George Helmsley.**—An old Barometer Chart and Register, Sir, in one of my poor father's log books, which I think is what my uncle was looking at just now?

**Helmsley Senior.**—You scarcely give us time to explain any thing, Wrongham; but now remember as a fixed rule that the Barometer and Sympiesometer are always falling as the centre is approached and are generally at the lowest within, or *at*, the centre, or just as it is passing nearest to the ship. Now to come back to our example. That the wind is in the same quarter shews only, as you rightly say, that the centre is on the same line of bearing, and thus that it has been keeping way with us, but if it had neared the ship, her Barometer will have fallen, and if the ship has increased her distance it will have risen; all this more or less, if ever so little; for in different parts of the world and even with different Cyclones in the same parts of the world, both the entire fall of the Barometer and its *rate of fall* vary as the centre is approached. We do not know the reason of this, but it is so undoubtedly, and the careful seaman who keeps a good look out on the appearances of the weather, *and* on his Barometer and Sympiesometer can be at no loss to tell when the centre is nearing him, or if he is running in upon it. Now in this case in which the Barometer, as you see by the Chart which George was looking at, was for two days, though low, always the same, it is clear that the ship was scudding parallel to the Cyclone, and if you turn the little diagram any way, so as to make any part of it North, you will see that it holds good. So for this one you may safely mark the track as one in the same direction as the ship's course from West to East.

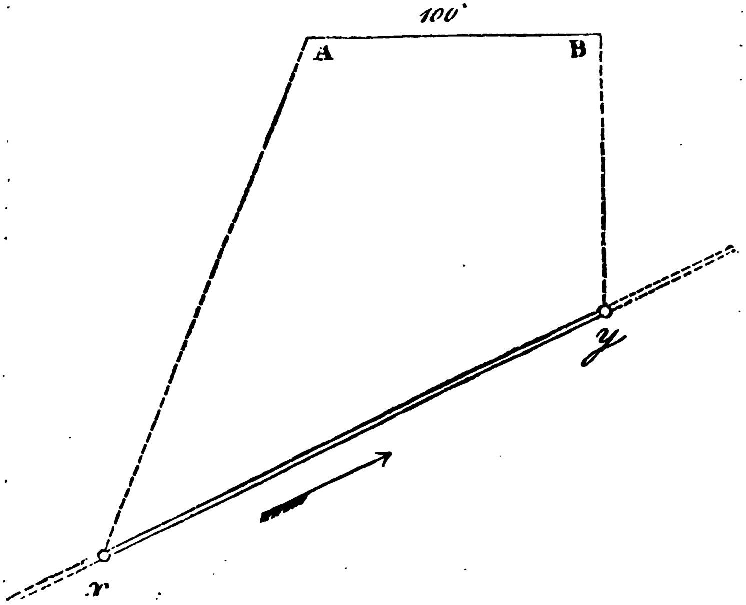
**George Helmsley.**—And travelling at the same rate, Sir? But I see that in the books the wind circles of the Cyclones are marked. Had we not better mark ours on the diagrams as I have done here on my sketch?

**Helmsley Senior.**—No; for it is better to use the Horn Card, since you do not put those circles on the Chart, or very rarely, and I wish to shew you the use of the Cards completely, as if you were at sea. In a case in which you wish to consider carefully the ship's position, as we shall do by and bye when I come to shew you a few practical lessons upon the Charts, the best way is to take a piece of thin hot-pressed writing paper, and laying it on the Chart mark off one or two meridians and parallels and the ship's place, and use that as a temporary Chart to lay down your run with the bearings of the centre, and thence sketch what you estimate to be the track, and what *is to be* your run or drift.

**Mr. Severn.**—Very true, Sir. That would be as if one had cut a piece of the Chart out to use it. I have seen a harbour Chart copied so and pasted afterwards on thick paper. What was it the mate of the *Regulus* called that, George?

**George Helmsley.**—*Tracing* a Chart, Severn. We used to trace sometimes at school when the drawing-master was not looking at us; but he always found us out.

**Helmsley Senior.**—Well, now, let us first put this same ship's run of hundred miles due East in the Southern hemisphere again, and



suppose her, as before, on the North side of the Cyclone circle.

**Capt. Wrongham.**—And the Cyclone track to the Eastward, as before? and you have not told us how she has the wind.

**Helmsley Senior.**—Suppose then that when the ship is at A. she has the wind at W. N. W. How has she the centre bearing from her?

**Capt. Wrongham.**—Why, let me see—for this new kind of boxing the compass still puzzles me. West gives centre bearing South in the Southern hemisphere as we said before. Here, master George, stand up for a telegraph again. Stand as you are, for your back is about to the W. N. W. Now hold out—let me see—the *right* arm for the Southern hemisphere—S. S. West. All right, Helmsley! That's a good plan any how. Your Card says the same thing, Severn, of course?

**Helmsley Senior.**—Now lay down a S. S. W. bearing line from A. to *x*. of two hundred miles, as the first supposed place of the centre, and let us next allow that after her ten hours' run of a hundred miles the ship has the wind at West. This as you know gives her the centre bearing South like the former ship. Lay down that bearing line also, Mr. Severn.

**Capt. Wrongham.**—And now for this time how is the Barometer and what is the appearance of the weather?

**Helmsley Senior.**—And add the sea too, Wrongham, which is always a capital indication to the eye of a seaman. Well, the Barometer has fallen very considerably, the sea has increased rapidly and become much more confused, and every squall is blowing harder; in short all the appearances are those of the centre's now being much nearer to the ship. What do you say under such circumstances as to the distance of the centre?

**Capt. Wrongham.**—Why, I don't know. What do you say Severn?

**Mr. Severn.**—Suppose, Sir, we say it is now only at hundred miles from her, or half what it was before?

**Helmsley Senior.**—Very well. Lay down the hundred miles on the bearing line at *y*, and join *x* and *y*. What course does that give for the Cyclone track?

**Mr. Severn.**—East 25° North, Sir, by the protraction, or about E. N. E. by the Horn Card.

**Capt. Wrongham.**—Well, but the distance on the line of the track is much greater than before.

**Helmsley Senior.**—It is so. Measure it, Mr. Severn, and see what it gives per hour.

**Mr. Severn.**—It is two hundred miles, Sir, which gives twenty miles per hour for the rate of the Cyclone's travelling.

**Capt. Wrongham.**—Why the Cyclone then will catch the ship! Let me try that. Give me a larger piece of paper. Now here is the ship keeping on her course—that's if she can—and the Cyclone doing the same and the lines cross here.

**Mr. Severn.**—But you forget the rates, Sir.

**Capt. Wrongham.**—Very true. Let us take another ten hours' run for each. Well, that allows the Cyclone just now to cross about seventy or eighty miles ahead of the ship.

**Helmsley Senior.**—Yes, but this is very dangerous work, because you are never certain of the *exact* distance of the centre nor of the *exact* course of the Cyclones, remember. See how the centre bears also now, Wrongham.

**Capt. Wrongham.**—About E. b. S. I see: why that gives her the wind S. b. W.! she could not run with the wind and sea so nearly abeam if she was not a man-of-war.

**Helmsley Senior.**—No, and she would have kept away gradually if she had been determined to run, so as to fetch farther to the North, but this is sufficient for an example only, and we left her ten hours ago with the wind at West. That is how many points, George?

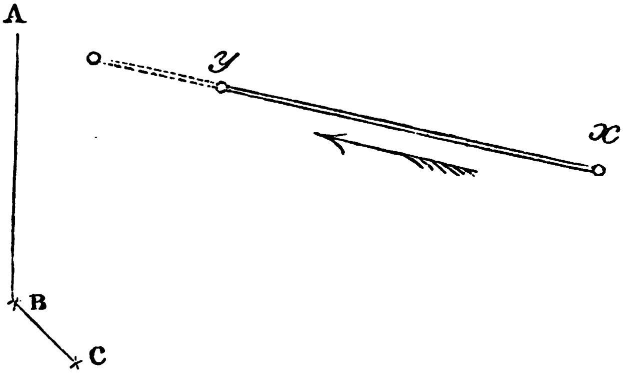
**George Helmsley.**—Seven points, Sir, in ten hours.

**Capt. Wrongham.**—Well, that was a true hurricane for those ten hours no doubt. Come, I think I understand pretty nearly how the track is estimated, but I wish you would give us another example, Helmsley, in the Northern hemisphere.

**Helmsley Senior.**—Very well, here is one. Put a mark, George, on another paper for the ship's position at Noon at A. with the wind at N. b. E. How is the centre bearing in the Northern hemisphere?

**George Helmsley.**—E. b. S. Sir: at what distance shall I put it?

**Helmsley Senior.**—At *x* 250 miles. Now suppose the ship to steer South at the rate of 9 knots per hour to B. and at midnight



the wind has veered to N. West, but much heavier, with the Barometer still falling fast, how will the centre then bear from her, Mr. Severn?

**Mr. Severn.**—N. West, Sir, in the Northern hemisphere gives the centre bearing N. East.

**Helmsley Senior.**—Well, then draw a N. East bearing line and make your own estimation of the distance of the centre from the ship, allowing the weather to have become so heavy that, as she steers badly, she can only now be kept right before it to the S. E.

**Mr. Severn.**—Then the Cyclone must at least be half as near again as it was at noon. Shall I put that down, Sir, at *y?*

**Helmsley Senior.**—Yes, and continue that track of the ship to the S. East to C. Now in a short run on this course of thirty-six miles in four hours, she has brought the wind to West. The centre is therefore bearing ———

**Capt. Wrongham.**—North in the Northern hemisphere. Is it still blowing harder and harder?

**Helmsley Senior.**—No, nearly the same, but the Barometer is inclined to rise.

**Mr. Severn.**—Is not this a case of a ship crossing in front of a Cyclone, Sir?

**Helmsley Senior.**—Not exactly of crossing in front, but rather of running to the Southward to get out of the way of a Cyclone by a ship caught in front of it.

**Capt. Wrongham.**—Well, but suppose the Cyclone had been coming down from the N. E. or E. N. E. upon him, he would have been doing wrong and putting himself in the way of it?

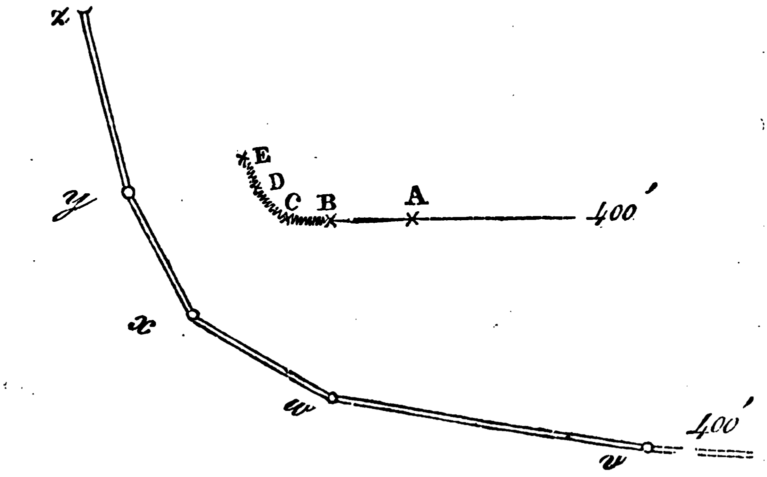
**Helmsley Senior.**—You forget that if it had been coming down upon him he would have kept the wind nearly in the same quarter, as you will see upon trial with the Storm Card. When he once brought the wind to N. N. W. steering as I have said, he might then safely consider, unless his Barometer was falling very fast, that he was gaining to the Southward of it since he had changed its bearing four points.

**George Helmsley.**—But if his Barometer *was* falling very fast, Sir, though he had got the wind to N. N. W.?

**Helmsley Senior.**—He would then know that the centre was nearer to him than he had supposed, and, if his ship steered well, haul a point or two to the Westward instead of keeping on his South course, every mile of which takes him as you see out of danger. Or he might keep right before it, if obliged to do so, and so make Easting while the Cyclone was making Westing; or heave to for a few hours, being certain that the centre would pass him to the Northward in a very short time, though very close.

**Capt. Wrongham.**—Of course a man must consider what kind of a craft he has under him. I should not have liked to have tried your scudding long with the old *Milton*, "The Barge," we used to call her, because of the enormous cargo she would carry; nor your heaving to in the *Palmyra*, that was built with a kink in her keel and never sailed upright even with the wind right aft.

**Helmsley Senior.**—Here is another example for you in the Northern hemisphere. Mark off two nearly parallel lines, George, at a hundred miles distance from each other, and make the ship's place to be at A. on the northern line and the Cyclone centre at *v* on the southern one.



Now suppose her to have been running West for two days to A. with the wind at N. E. at the rate of two hundred miles per day with a low Barometer and all other appearances of a Cyclone, but that the wind continues steady at N. E. and does not blow heavier, nor does the Barometer fall any lower on the second day. If this *is* a Cyclone how is the centre bearing, Mr. Severn, and what track has it made?

**Mr. Severn.**—I have been considering, Sir, it is a Cyclone following the ship and its centre bearing S. East of her.

**Capt. Wrongham.**—Not following her, properly, Severn, that is right astern, but chasing her as it were on the port quarter.

**George Helmsley.**—Running parallel to her, but at some distance astern, Sir.

**Helmsley Senior.**—Both right. Now on the third day the Barometer falls more and the gale increases, the ship heaving to being afraid to run farther in with the land, and in a few hours she finds that the wind hauls from N. E. to East. What is this an indication of?

**Capt. Wrongham.**—Worse weather to be sure, what else?

**Mr. Severn.**—You forget, Sir, that the Cyclone has been chasing us for two days.

**George Helmsley.**—And is now bearing South, Sir.

**Capt. Wrongham.**—Oh aye! Well I *did* forget that, I must say, and the weather is worse. Let me see what is to be done.

**Helmsley Senior.**—There is always a first consideration in these cases you know, Wrongham. What is it?

**Capt. Wrongham.**—Why. How the ship will scud or lie to, and if every thing is snug and you have good helmsmen ———

**Helmsley Senior.**—That is for the ship, but what of the Cyclone?

**Capt. Wrongham.**—Oh, I know; you told us before that we must always know how the centre bears. Well, it bears South.

**Helmsley Senior.**—Mark off the ship's run, which we will allow to have been four hours on the same course, which at the rate of two hundred miles per day will be thirty-three miles before she heaves to, and lay down the bearing of the centre. Now for its place on the bearing line.

**Capt. Wrongham.**—It is nearer of course; how much shall we say?

**Helmsley Senior.**—A little only. Give the Cyclone a W. b. N. course up to *w*, where it comes on the meridian of B.

**Capt. Wrongham.**—What next, Helmsley? The ship is hove to and waiting for orders now no doubt.

**Helmsley Senior.**—She may soon find it lucky that she *is* hove to. Let us suppose now that with her Easterly gale the ship has drifted to C. and that the wind has hauled to S. East, where would the centre be, Mr. Severn?

**Mr. Severn.**—S. West of her, Sir. I will lay it down here at *x*. Then she will drift to the N. West no doubt.

**Helmsley Senior.**—Yes. I have marked two more of her supposed drift positions, at D. when the wind veers to South still blowing heavily, and at E. when it is finally moderating rapidly with a rising Barometer and the wind at S. W. so that judging of the distance of the centre by the Barometer, you see that the Cyclone has curved up in front of the ship through the points *w*, *x*, *y*, and *z*, while she has been hove to.

**George Helmsley.**—And she has avoided running into the Cyclone centre too.

**Capt. Wrongham.**—Yes, if all this is made out to be true, we shall have you youngsters crowing over us as usual.

**Helmsley Senior.**—That's not fair, Wrongham; recollect how often you have told me about the fellows who were caught in the gales with all their sticks aloft and no reefs in, when your capital Barometer and your long experience of it had warned you to make all snug the evening before. We must have some young men to replace the old ones, as we must have new ships to supply the place of those which are worn out; and when George gets a command let us hope that like Mr. Severn, he will undertake it as fully qualified to do his owners justice according to the present state of nautical science, as you were thirty years ago when you first purchased your Barometer.

**Capt. Wrongham.**—By your advice, Helmsley; though I confess now I did think at that time it was not money well laid out. But now we understand all about this, I want to hear your proofs.

**Helmsley Senior.**—Not *all* as yet; for you have a whole division of the science yet to learn.

**Capt. Wrongham.**—What the deuce can that be, Severn! You have been reading the books I know, and I see master George looking mischievous, so there is something no doubt.

**Mr. Severn.**—Mr. Helmsley has not yet explained to us the beautiful rule for heaving a ship to.

**Capt. Wrongham.**—Nonsense, there can't be any more rules for that surely?

**Mr. Severn.**—There is, though, I assure you, Sir, and a capital one.

**Capt. Wrongham.**—Well, Helmsley has left us, I see, so we must wait till we meet again: but I can't believe that I don't know how to heave a ship to in a gale of wind as well as any philosopher that ever stepped over a gangway.

## CONVERSATION VI.

### The Rule for Heaving to.

**Capt. Wrongham.**—Well, Helmsley, now we are to hear all about this clever rule for heaving a ship to in a gale of wind.

**Helmsley Senior.**—There *is* more cleverness in it than you think, Wrongham. I am an old sailor; as old a one as yourself—and not very fond of new-fangled doctrines,—yet I confess I am struck with the beauty and simplicity of this rule every time I consider it. Now when you were scudding and thought proper to heave to *why* did you choose one tack rather than another?

**Capt. Wrongham.**—Why, some ships lie to better on one tack than on another. Sometimes you try for a drift nearer to your course, and sometimes you think she takes the sea better on one tack than on the other, or you judge the wind will haul in a particular way.

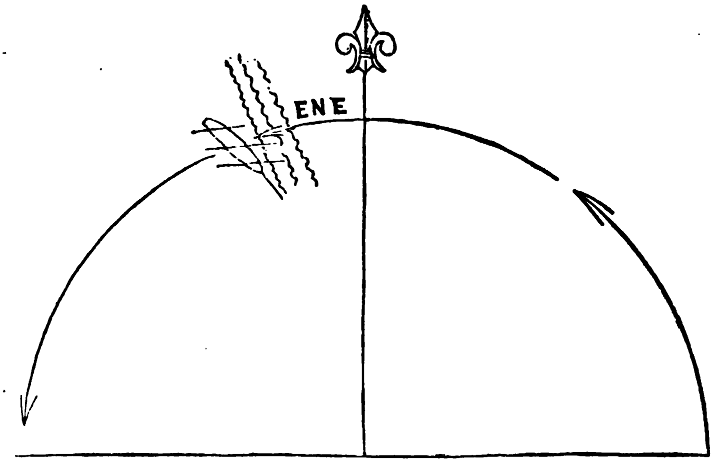
**Helmsley Senior.**—But if you find it heading you off what then?

**Capt. Wrongham.**—Why, wear ship of course.

**Helmsley Senior.**—But some ships won't wear readily when it is blowing hard you know, and it is ugly work to get them into the trough of the sea.

**Capt. Wrongham.**—Yes, we had our decks swept that way in the *Susan* when I was an apprentice in her. Two seas struck us, and the old hands said that if we had got a third she must have gone down.

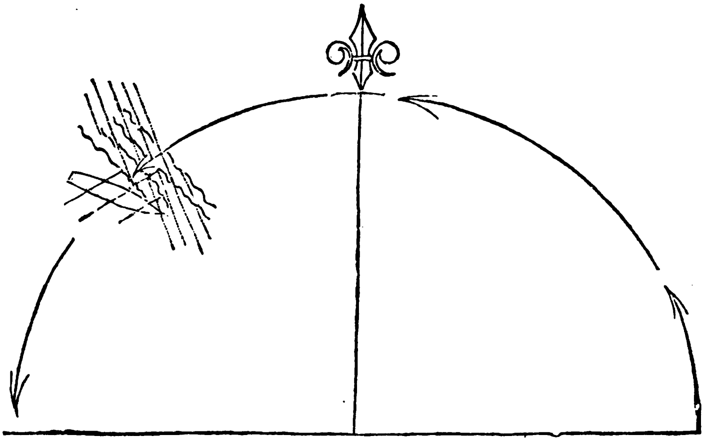
**Helmsley Senior.**—Well, then, we are agreed that the wind and the seas are the dangers in lying to. Let us see a little how these act before I give you the rule. First, then, let us suppose a ship lying to on the port tack with the wind at E. N. E.



She has her head to the S. E. and the sea in the direction of the waved line, i. e. from N. N. W. to S. S. East, while this wind lasts.

**Capt. Wrongham.**—But there is sometimes a cross sea at the beginning of a gale?

**Helmsley Senior.**—Very true. We will explain that by and bye. At present we suppose only a regular and ordinary sea, and one proportionate to the force of the wind. Now suppose the wind to veer to N. East, it is clear that her head will now be E. S. E. and that the



old sea would for a time remain and a new one get up, of which the line would now be from N. West to S. East, but that the ship has '*come up*' to both seas and takes the remainder of the old sea four points on her port bow, and the new one six points, as shewn in the *Diagram* where the dotted line represents the ridges of the old sea; that is of course, and for the sake of the example, allowing her to come to within six points, though few ships do this when it is blowing hard.

**Mr. Severn.**—But the new sea would soon put the old one down, Sir, though it might at first make up a few heavy heapings and crossings?

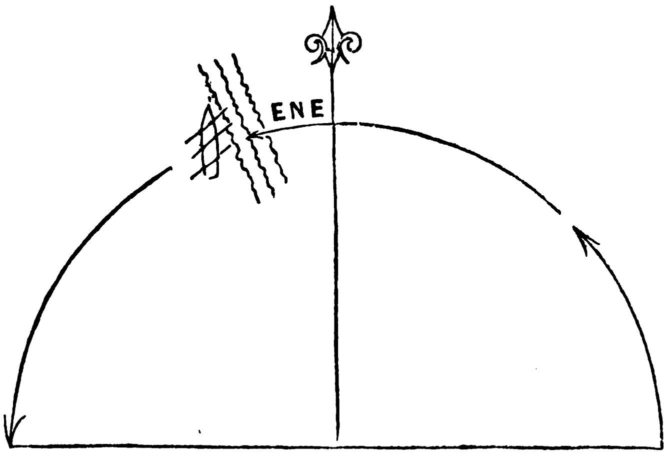
**Helmsley Senior.**—Yes, that is what I mean to say. Now if we take the wind to veer to N. N. E. we shall again have the old N. W. and S. East line of sea from the N. East gale, and the new one which will now be on a W. N. W. and E. S. E. line while the ship's head is due East. Supposing the centre always to have been at the same distance from her, what track would this give to the Cyclone, George?

**George Helmsley.**—One about from the S. W. to the N. East, Sir.

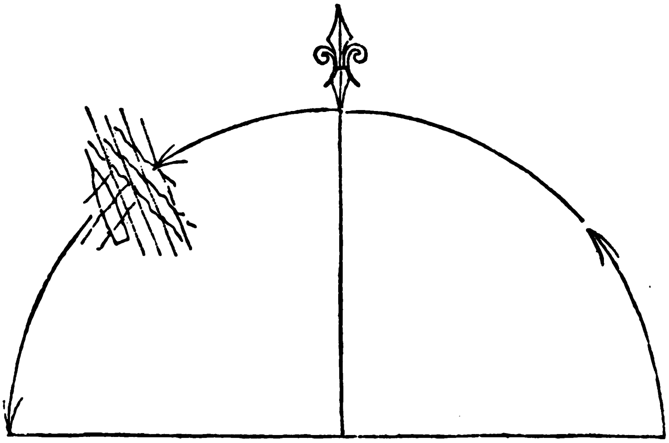
**Helmsley Senior.**—And now, Wrongham, *on which side of the track* has the ship been lying to?

**Capt. Wrongham.**—Why, I see by the Card she has been on the left hand side of the track.

**Helmsley Senior.**—And hove to on the *port* tack. Now let us put a ship in the same place with the same gale hove to on the *star-*



board tack. In the first instance she would have the wind E. N. E. and her head North, taking the line of sea as before. Then when the wind came to N. E. she would have her head N. N. W. and the line



of the new sea from N. W. to S. E. but the line of the old sea is exactly in one with her keel, that is, it is a beaming sea so long as it lasts.

**Capt. Wrongham.**—Yes, he has been breaking off and gets those ugly washers of seas besides. Well, he must wear ship, that's all.

**Helmsley Senior.**—At night! with a weak-handed crew; an unhandy craft; overloaded or already leaky, Wrongham? How many thousands of brave fellows, and even millions of money, think you, have been buried beneath the waves of the fierce Atlantic in attempting some such manœuvre; or in lying to on the wrong tack till it is too late, and sea after sea is swamping the decks, and sweeping the hands from the pumps, and even from the helm! till with the bravest it comes to "God help us! for *nothing* can be done!"

**Capt. Wrongham.**—Yes, there have been awful losses there, no doubt, if we had only the muster roll of them for the last two hundred years. The French and Americans and Spaniards too have all had their share.

**Helmsley Senior.**—Take the next shift to N. N. E. and you will see that the chances are, that the sea is, if anything, more dangerous; for any remains of the old sea from the E. N. E. gale will now be abaft the beam, since the ship's head will be N. W.

**Capt. Wrongham.**—But I don't see exactly what your rule is, Helmsley, for all this.

**Helmsley Senior.**—Try back a little, by going over your ground again. See what you have done, and what has been the result of it.

**Capt. Wrongham.**—First we hove to on the port tack, and had the wind always drawing aft, so that she came up to the wind and sea comfortably. Then we tried her ———.

**Mr. Severn.**—You forget, Sir. We found then that the track of the Cyclone was to the N. E. and we had been on the left hand side of it.

**George Helmsley.**—Yes. *Left* side and *Port* tack. No forgetting that.

**Capt. Wrongham.**—Well, let me go on. Then we tried her on the starboard tack and every thing went wrong, and we were in a mess, and found out that it was not safe to wear her even.

**Helmsley Senior.**—And which tack then was the *right* one?

**Capt. Wrongham.**—The port tack, to be sure.

**Helmsley Senior.**—Well, you have been *making* the rule yourself, which is thus given by Col. Reid—

"When on the *right* side of the track of a Cyclone heave to on the starboard tack. And on the left side on the larboard (port) tack, and this in both hemispheres."

**Capt. Wrongham.**—And do you mean to say that there is any proof of this? because if there is, it is certainly something wonderfully simple and mighty easy to remember.

**Helmsley Senior.**—There are hundreds and thousands of proofs of it on record; and where it has been supposed to fail, that has been found to arise from some mistake in the estimation of the track, or in the logs or the copies of them. You may try it yourself in any way you please, and as often as you please, and thus *make* proofs for yourself.

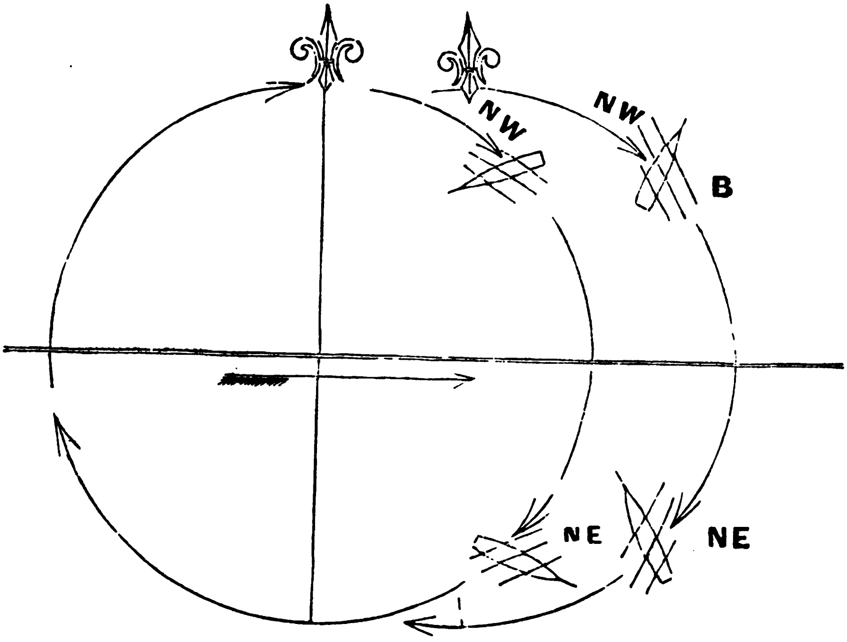
**Capt. Wrongham.**—Now, Severn, what are you and George laughing at?

**George Helmsley.**—Severn was going to ask if you wanted that rule put into a Negro song, Sir? He has got it ready, he says. Hand it out Severn, and don't call it mine.

**Mr. Severn,** In a Cyclone to keep from being taken aback,
And from breaking off too, you must first find its track,
Then on the *right* side starboard safely comes to,
And on the *left* side the port tack will do.

**Capt. Wrongham.**—It's easy enough to remember without that. Have your laugh out boys at the old man's dullness, but recollect that when you get to my age, and have fought every inch of your road as I have, you will not find all your knowledge lying at single anchor and ready to shift its birth so quickly as yours is now.

**Helmsley Senior.**—Why, Wrongham, you forget the days when you and I used to find it difficult to repress a smile if any thing amused us. But, come, let us take two ships now, at the same time, in the Southern hemisphere, and see how the wind veers with them when hove to on the right and wrong tacks. Here is a track in a high Southern latitude from the West to the East; which is its right and which the left-hand side?



**Capt. Wrongham.**—The North is its left-hand side and the South its right-hand.

**Helmsley Senior.**—Right. Now suppose a ship hove to with a gale at N. W. If she is on the starboard tack will she be on the right or the wrong tack? Take the Horn Card and try.

**Capt. Wrongham.**—Why, how does that shew? Oh, I see by moving it on like the Cyclone. Well, here is the ship's head W. S. W. on the starboard tack with the N. Westerly gale, and I slide the Card along over it.

**Helmsley Senior.**—Keep the centre on the line of the track as near as you can.

**Capt. Wrongham.**—Hallo! Here he is with the wind at W. N. W. in no time. Well that's the wrong tack both by the rule, and as we see by the Card. Look, Severn!

**Mr. Severn.**—And George and I have been putting another ship at B. here close to him, Sir, but upon the port tack, and as his head is N. N. E. with the N. Westerly gale he will come up North, when it gets to W. N. W. and so on.

**Capt. Wrongham.**—Yes, true enough; and I understand that you make the wind jump two points every time, Helmsley, just to shew us clearly, but now this is for one side of the track. Let us try the other. Here, George, you are an idler to-day. Put a ship on the right-hand side of that track.

**George Helmsley.**—Wind how, Sir?

**Capt. Wrongham.**—Wind the same, of course. No, stop! it can't be the same, let me look at the Card. How shall we put the wind, Helmsley, for a good trial?

**Helmsley Senior.**—Taking your track to be the same, make it N. East, because that gives you the full extent of the Card in that quarter, and put your first ship on the port tack.

**Capt. Wrongham.**—That ought to turn out the wrong one for starboard side, starboard tack and left-hand side port tack. Hand me your sketch, George. Here she is, let's see. How puzzling this wind compass is though! Wind N. E. port tack, well, head E. S. E. Now for the Card to move along the track. Yes, here it veers to E. N. E. and she must break off, and is wrong of course. Now for the other on the starboard tack. Wind N. E., head N. N. W. and when it comes to E. N. E. he comes up to North. Well that's all fair enough, and we've done with that I suppose?

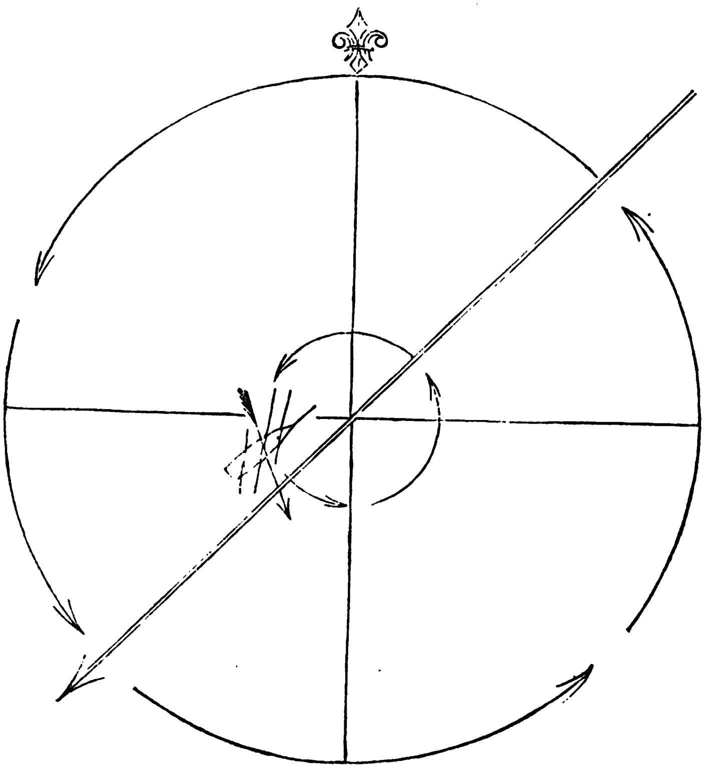
**Mr. Severn.**—No, Sir, not quite yet, I fancy: Mr. Helmsley will, I hope, give us some examples of ships lying to and the centre crossing them, for these must be the worst kind of cases.

**Capt. Wrongham.**—What business have they to lie to in the way of the centre if they can always calculate the track?

**Mr. Severn.**—No sea-room, Sir. or a ship that won't scud safely.

**Capt. Wrongham.**—Yes, I didn't think of that. One can't think of everything on shore here amongst these new-fangled notions. Why the sight of that Card is enough to upset one's brains for a week. I'm not quite sure I shall be able to tell how a ship will lie upon the opposite tack after going about without considering a bit, now. But Helmsley, give us some examples of the kind Severn wants.

**Helmsley Senior.**—Well; take a ship in the Northern hemisphere lying to in a Cyclone, which is travelling down from the N. East.

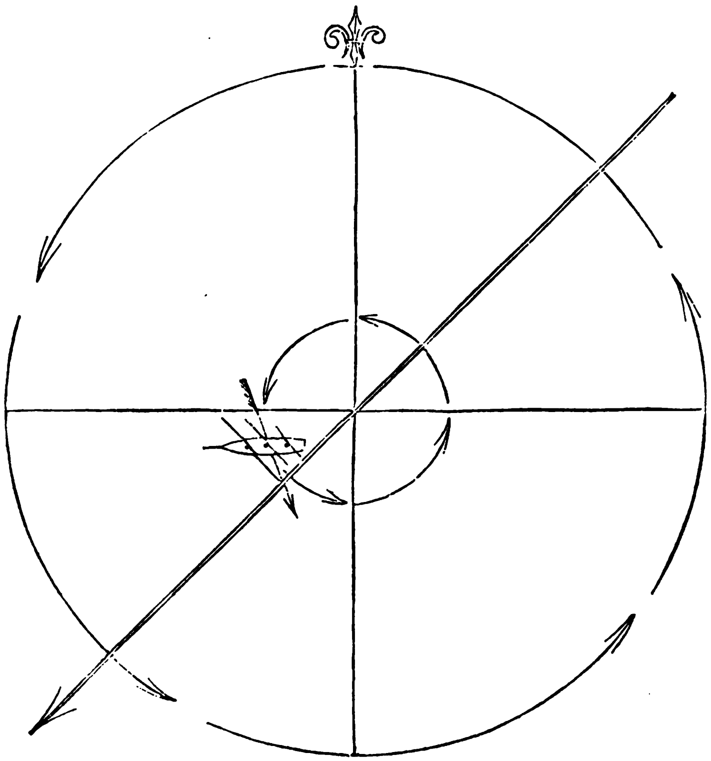


**Capt. Wrongham.**—But *do* they ever travel so, Helmsley?

**Helmsley Senior.**—In the Bay of Bengal and China Seas, almost always from some point East of the meridian. Give her the wind N. N. West, and put her on the edge of the centre, and make for the centre rather a large circle. Now choose for yourself, Mr. Severn, and put her on the right or wrong tack as you please.

**Mr. Severn.**—Well, then, Sir, I will put her on the port tack which will be the wrong one, for N. N. W. is on the right hand of the track, and her head will then be N. East.

**Helmsley Senior.**—And as the Cyclone moves on, the N. N. W. wind will change to S. E. or E. S. E. if the exact centre does not reach her, giving her the wind dead on her lee beam, as you see, which is, with the new burst of the hurricane, a most fearfully dangerous position from the wind and *lee sea*. But now put her on the starboard tack, George. She will then have her head ——— ?



**George Helmsley.**—West, Sir; and the shift to E. S. E. or S. East will then be four to six points abaft her beam, and all her yards will be pointed to the wind, so that with the foretopmast staysail, and easing off the port head braces, she will bear up, and head the former sea by herself.

**Capt. Wrongham.**—You are making a nice handy craft for yourself, Master George, but after all, these centres are ugly births to get into, that's clear. But now, let us see what happens when the actual centre passes over the ship, and when, as in this case, she has the wind shifting from N. W. to S. E.

**Helmsley Senior.**—In that case both tacks are alike, for on the port tack, with the wind at N. W. she would be lying N. N. E. with her yards braced up to N. N. W. or thereabouts, so that the lee yard arms would point to the S. S. East; and the wind shifting to S. E. will bring it two points abaft the beam and lay the yards flat aback. On the starboard tack she will be lying W. S. W. with her yards braced up to W. N. W. and lee yard arms pointing to the E. S. E. The wind at S. E. will be, also, two points abaft the beam and two points before the line of the yards as before, and she will in both cases be thrown over *against* the sea, which will immediately become a *lee* sea to her, and I need not tell you how dangerous that is.

**Capt. Wrongham.**—Yes, I see. Take either tack and any track for the centre you please, it is only shifting every thing end for end in one's mind, as it were.

**Mr. Severn.**—But then, Sir, if it is possible to have a choice in such cases, is it not better to consider also if you get her on the right tack for the future veering of the wind in the last half of the Cyclone?

**Helmsley Senior.**—No doubt it would, but the fact is that, for a time at least, nothing can be done, not even by the smartest man-of-war, to say nothing of a merchantman. "The Cyclone is master," and we are but too happy to save our masts from a ship almost blown over in a tempest ready to tear them out of her at every gust, and which is ripping up the weather boarding, boats, and lighter bulwarks like sheets of pasteboard! The chance you have is to get her head the right way in the calms and puffs at the centre.

**Capt. Wrongham.**—That's true enough, but then, Helmsley, what *is* the use of all this new-fangled science of yours?

**Helmsley Senior.**—George, what do you think is the use of the science in such a case as this?

**George Helmsley.**—Why, Sir, as I have been understanding it all along, the true use of it is, like good advice to us young hands, *to keep the sailors from getting into a bad mess.*

**Mr. Severn.**—And to have every thing ready if for want of sea room one is forced into it, and to take the right advantage of every chance to get out of it, even at the very worst.

**Helmsley Senior.**—Exactly so. Half the mischief which occurs from bad weather arises from want of preparation and bad management; and this is true of men-of-war as well as of merchantmen. Every old sailor knows that it is wonderful what a good ship, well prepared and handled, will go through; and can cite instances of the finest vessels having been reduced to utter wrecks, if not totally lost, by sheer want of time, or of foresight, or through miserable mismanagement.

**Capt. Wrongham.**—Well, Helmsley, you have fairly answered my question, I must say; but it seems to me that I can't yet, as it were, get rid of the old notion, that a gale or a Cyclone as you call it, is something which comes on when it pleases, and that you know nothing about it before it reaches you; and little enough when you are in it. These youngsters, I see, (I mean you, Severn, as well as George,) take hold of the notion of calculating upon what is coming before-hand much quicker than I do.

**Helmsley Senior.**—No; one's mind is not so ready, Wrongham, at our age to take up new ideas like those of younger men; and sailors above all other people are liable to have their minds so *stiffened* by the peculiar nature of their pursuits that they find great difficulty in supposing the possibility of any thing new, and much more in comprehending and applying it readily; but it is not so difficult if we accustom ourselves to think over it in fine weather, and in all weathers, to be ready for bad weather.

**Capt. Wrongham.**—Well, Helmsley, that is fair enough too. But you have promised us some practical examples. I want to hear them, because one is a little confused at first in considering the question of scudding or heaving to with these new discoveries of yours.

**Helmsley Senior.**—Very good. At our next meeting I will try to put all the cases which can occur into a few simple rules.

## CONVERSATION VII.

SCUDDING OR HEAVING TO.—CYCLONE SAILING.—THE SEA.

**CAPT. WRONGHAM.**—Well, Helmsley, we are to understand all about the question of scudding or heaving to to-day. I think there must be some cases which will be puzzlers for you in this. However, I won't tell you what I am thinking of now. Wait a bit.

**HELMSLEY SENIOR.**—I shall be glad to hear your case, Wrongham, whenever you like to put it, and I hope our science will be able to give it a creditable answer. Now, George, let me see if *you* understand this question properly. What is the first thing you have to consider when you are satisfied that the gale which is rising is the onset of a Cyclone?

**GEORGE HELMSLEY.**—Sea-room, Sir, of course.

**MR. SEVERN.**—No, no, George! it's your ship.

**GEORGE HELMSLEY.**—Very true! now I see, for sea-room or not there may be something to do which your ship can't do; or can't do safely.

**CAPT. WRONGHAM.**—To be sure, youngster, you were going too fast ahead there, and Severn very properly brought you up. I see he has not forgotten our voyage home in the leaky old *Bacchus*. Wait till you get through such a job creditably, and get the thanks of the underwriters for it. Well, Helmsley, you will, I suppose, allow us a stout ship and sea-room.

**HELMSLEY SENIOR.**—Yes, and the third requisite to a free choice in your management.

**CAPT. WRONGHAM.**—Hallo! what is that? can you tell, Severn?

**MR. SEVERN.**—Why Sir, the ship should steer well if scudding, for example.

**HELMSLEY SENIOR.**—Exactly. Before the Sailor can make his free choice of what he will do when he is on the verge of a Cyclone, he must consider if he has (1) sea-room, (2) a stout ship under him, (3) and a *manageable* ship also, which will either scud or lie to safely; for some craft, amongst merchantmen particularly, will lie to well but are dangerous vessels to scud with, and so forth.

**Capt. Wrongham.**—Of course, one thinks of all that at the time, Helmsley; but what is the use of being so precise?

**Helmsley Senior.**—Scarcely a fair question that, Wrongham, from you, who hardly yet seem to believe that we understand and can demonstrate our own science; and from you again, who intend to blockade us with unanswerable "puzzlers," if you can manufacture them. The use of being precise is to shew you that we who believe in, and teach, the Science of Storms understand the sea, and all pertaining to it just as well as those who do not believe in it, and will not take the trouble of looking into or studying it. You will allow now, that if I had omitted this condition of the qualities of the ship, and set it down in my own mind only, and thought it therefore settled in your's, that the ship's capabilities would be properly considered, you might, in thinking of the matter afterwards, have been somewhat puzzled by it as a new difficulty; and a stranger might fancy that after all, the science was only a landsman's crochet, who would be sure to find he had omitted something important when it came to practical work. But let us continue. We must have sea-room, a stout ship, and a manageable ship, and there is a Cyclone coming on. Now, how will the ship be, as regards her position?

**Mr. Severn.**—Why, she may be before it ———

**Capt. Wrongham.**—Or, behind it ———

**George Helmsley.**—Or, on either side of it.

**Helmsley Senior.**—Well answered, amongst you. Now each of these positions requires a different system of management.

**Capt. Wrongham.**—Yes, and if there is a choice one must take that plan which will take you most towards your port. Now say, behind it.

**Helmsley Senior.**—And it is travelling, how?

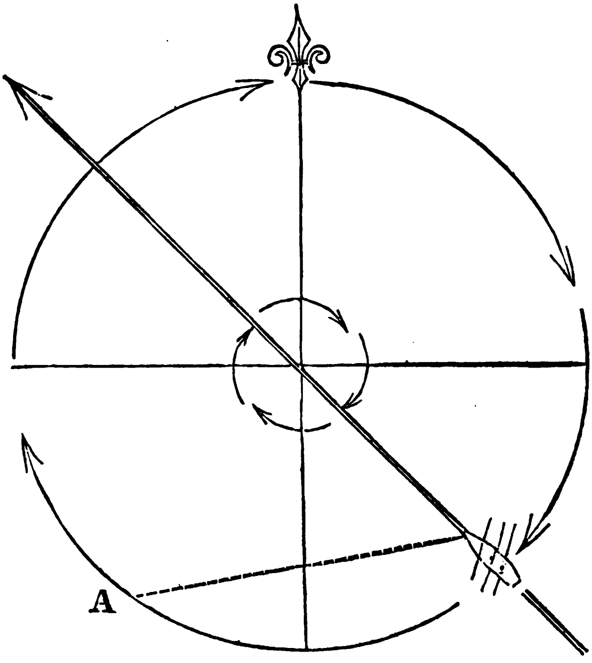
**Capt. Wrongham.**—Well, upon your track, or nearly so.

**Helmsley Senior.**—And do you allow it to be giving you a fair wind or a foul one?

**Capt. Wrongham.**—Let me consider. Well, with a foul wind I can only stand on one tack or the other; and the Cyclone is always moving away from me, and it will reach my port, if it goes so far, before I shall.

**Mr. Severn.**—But if you are right behind it, and the Cyclone track and your course are the same, Sir, you will have the wind right athwart your course.

**Capt. Wrongham.**—Very true. How puzzling this new work is. Let us have a figure.



**George Helmsley.**—Here is one, Sir, that I was making. It is for the Southern hemisphere, with the track moving up to the N. West. Now, if we put the ship right behind it, her course being to the N. W. also, she will have the wind abeam as Severn says.

**Mr. Severn.**—Yes, and a tremendous sea, being in the wake of the Cyclone.

**Capt. Wrongham.**—Well, with a beaming wind I can perhaps go 7 or 8 knots. Suppose the Cyclone is only travelling 6 or 7, I shall get farther in towards that spiteful-looking centre which you have put there with its twisted arrows, Mr. George.

**Helmsley Senior.**—Right: so then, when behind it, the first rule is ———

**Capt. Wrongham.**—Not to run too far into it. Well, I suppose, then, I must heave to. What will the owners say to heaving to with a fair wind?

**Helmsley Senior.**—That you did quite right if the fair wind was leading you into danger. You can always make them understand that on your arrival, as you understood it yourself, surely? especially if you have a memorandum and a little diagram ready. Or you can always refer to me, or to some one who understands the science, to confirm your judgment. But I fancy owners and underwriters are glad enough to see ships arrive safe, if in reasonable time, and this is usually but a delay of a few hours. But it does not follow always that you have to heave to, for the Cyclones usually move at quicker rates than the sailing of ordinary ships, and there is so much sea that running long with the wind abeam becomes highly perilous. What is best to be done then, Mr. Severn.

**Mr. Severn.**—I think I would keep away, Sir, for a few hours, so as to get out of the worst of the sea, say upon the dotted line to A. to bring the wind to East or E. S. E. and then haul up gradually, so as to run, not *upon* the track but make a parallel to it, and take my chance of a wind for hauling up when the Cyclone left me.

**Helmsley Senior.**—That would be the proper plan. You would probably lose no distance in the end, and certainly escape the heavy rolling and plunging of the sea in the rear of the Cyclone.

**Capt. Wrongham.**—Well, but if I had not sea-room, or, what is the same thing, since we have allowed sea-room, suppose I could not afford to keep away for fear of falling to leeward of my port, and being unable to beat up again? After all I must heave to then.

**George Helmsley.**—And on the right tack, Sir, to meet the sea to the best advantage.

**Capt. Wrongham.**—Well, I knew that, youngster, long before you were born.

**Helmsley Senior.**—No doubt, there are cases when we cannot profit as we would wish to do by a Cyclone, but they are like those in which the sailor finds himself close to his port or at the entrance of a narrow or difficult passage with fogs or thick stormy weather, and though he has a fair wind he dares not run on, however certain he may feel of his position. No one thinks the worse of him for that loss (I ought to say *expenditure)* of time, nor does he himself regret it afterwards.

**Capt. Wrongham.**—That's true; and many a good ship has been lost for the false economy of a few hours!

**Helmsley Senior.**—Well, we have disposed of the case of a ship behind the Cyclone, which is easily remembered. Which shall we take next, Mr. Severn?

**Mr. Severn.**—On one side of it, Sir.

**George Helmsley.**—But not too far behind or before it, I think, Sir?

**Helmsley Senior.**—No. If upon a line at right angles to the track of the Cyclone that places a ship right abreast of it; and within four points before and abaft such a line, we may say that a ship is on one side of it. Which is the best birth of those two, Wrongham?

**Capt. Wrongham.**—Why, abaft his beam to be sure; that is, if your course lies at all the same way as the Cyclone's track, because you are not afraid of its overtaking you—just as one would be best pleased to get the first sight of a privateer on one's bow, carrying all sail from you if the wind was well aft. Is not that it, Helmsley?

**Helmsley Senior.**—Yes; the case in which your course lies the same way is one in which you have always to take care not to overrun the Cyclone by getting too far before it. And also not to steer too much into it; but if your course lies at all athwart it, Mr. Severn?

**Mr. Severn.**—Why then, Sir—let me see—you must be sure to have time to cross in front, if that is to be done, and not to cross too close if you cross behind.

**George Helmsley.**—Yes, I once nearly got swamped in a boat by a water-spout which we tried to cross, and it was only by pulling hard for our lives, I can tell you, that we kept clear of it. It was a foolish thing to do, but the mate was half drunk, and said he didn't care about water-spouts, and as we were all apprentices in the boat, we couldn't say any thing to him. He was sober enough by the time we got on board, with the fright.

**Helmsley Senior.**—That is exactly the case of a ship's crossing too close in front of a Cyclone.

**Capt. Wrongham.**—I have been thinking too, Helmsley, that if a ship is on either side, she can generally, if she is a little too far in, haul out a little or heave to for a few hours to get better weather. I suppose some of your Cyclone Sailors do this at times, don't they?

**Helmsley Senior.**—They could do nothing better, as you must feel. What *is* six hours' run compared with the loss of a single topmast only in a merchantman? and we will say nothing about the chances of her broaching to, being pooped, and the like.

**Capt. Wrongham.**—What are you nudging Severn, and grinning and pointing at, Master George?

**George Helmsley.**—Ask Severn, Sir.

**Mr. Severn.**—Why, George was pointing at a moth that was flying round the candle, Sir. I suppose he means that whenever it crosses too close, it will burn its wings?

**Capt. Wrongham.**—Something in that too! Many a poor fellow has had his wings singed, I begin to think, by these terrible Cyclones. Well, now, when we are *before* a Cyclone is the only remaining case. What can one do then?

**Mr. Severn.**—If not too late altogether, Sir, one might haul out of the way of the very worst part at all events.

**George Helmsley.**—Or heave to on the right tack, if one must heave to.

**Capt. Wrongham.**—Well, I see that; but if a ship gets into the centre, she is caught; and can do nothing.

**Helmsley Senior.**—Not always so, even then, Wrongham; bad as such a case is.

**Capt. Wrongham.**—Nonsense, Helmsley, you can't mean to say that the new science could possibly be of any use to a ship when she was once within the centre?

**Helmsley Senior.**—You forget only one half of all we have been talking about, Wrongham. Consider a little what *are* the objects of this new knowledge.

**Capt. Wrongham.**—Why; to shew us how to manage in hurricanes, or Cyclones, as you call them—that is, when you have sea-room.

**Helmsley Senior.**—And before you can know how to manage, you must know something else. What is it, Mr. Severn?

**Mr. Severn.**—I think, Sir, you mean that we must know its track, and how the wind will veer.

**Helmsley Senior.**—Exactly. You must first know *what is coming*, and then how to manage when it comes. Now a ship in the centre of a Cyclone, Wrongham, must have had its first half, or part of it, passing over her, or she has run through it to get there. She therefore knows the track, and by the track she knows what is coming; that is, what the shift will be. Now knowing this and being at the centre of a Cyclone, Wrongham, surely you can tell what use to make of it.

**Capt. Wrongham.**—Why, I see nothing to be done, as then you are becalmed, or next to it, with a tremendous sea on all sides of you.

**Helmsley Senior.**—Well, but you are not always, and indeed, but seldom, utterly becalmed, and there are generally puffs of one kind or other recollect. Now, what would you do in such a case, if for instance, you *know* the wind would in all probability come in a roaring hurricane down upon you from the N. West?

**Capt. Wrongham.**—Try all I could to keep her head to the South Eastward, or Southerly at all events, to avoid being taken aback to be sure. One don't want to learn that.

**Helmsley Senior.**—And yet you said a few minutes ago that the Science of Storms could do nothing for you at the centre of the Cyclone, forgetting that it is only by it that you *can* know how the shift will probably occur, and thus be prepared for it. Bad as any case may be, one is always the better for being forewarned. For "Fore-warned is Fore-armed" as the Saxon proverb says; and no one need remember that oftener than the Sailor.

**Mr. Severn.**—I recollect hearing a Spanish proverb, Sir, better even than that. It was this: *El hombre prevenido es medio vencedor.* "The warned man is half conqueror!"

**Helmsley Senior.**—Both are good, and of all knowledge which the Sailor can acquire, we claim that this more especially makes him half a conqueror—of his worst difficulties—for at the *very* worst it gives him time, and shews him what is coming. It will do more yet, for it will conquer for him, and with him, the difficulties of many long passages; and CYCLONE SAILING will ere long be a recognised part of every good seaman's management!

**Capt. Wrongham.**—Hallo! What do you call Cyclone Sailing, Helmsley? Is there any fine weather work too in your Science?

**Helmsley Senior.**—Not exactly fine weather work, for it is usually blowing pretty smartly, though not being what Sailors should call bad weather, especially as it consists in finding out fair winds, and profiting by them.

**Capt. Wrongham.**—Well, explain that to me a little. We have seen how to profit by a Cyclone if that is what you mean, but I don't understand what you mean exactly when you talk about "finding out fair winds."

**Helmsley Senior.**—But you allowed, when we mentioned the American liners the other day, that a good Cyclone might help a ship on for a good run for a few days, if she got on the right side of it?

**Capt. Wrongham.**—Yes, I did; that is a matter easy enough to see, provided the Cyclone does not move too fast.

**Helmsley Senior.**—And if, after one Cyclone ran on ahead of you, you could get another to come up in a day or two, that would give you the benefit of two of them, would it not?

**Capt. Wrongham.**—Certainly, but *do* they come up so conveniently?

**Helmsley Senior.**—There is reason to believe, that between 36° and 50° North, and between about 35° and 40° or 45° South, both in the Atlantic and Pacific Oceans, according to the seasons, there is a succession of frequent Cyclone Storms travelling from West to East. In the Southern Indian Ocean, they are now well known to many commanders, who make capital passages to India and Australia by looking out for them; and if they find them likely to pass to the Northward of their track, hauling up a little, so as to keep on that side which will give them a steady Westerly gale, and at a distance from the centre which allows them to scud safely.

**Capt. Wrongham.**—Well that's "taking a ride upon a Cyclone," as George said the other day.

**George Helmsley.**—And when the ship and Cyclone get tired of each other, getting a fresh one to go on with, Sir.

**Mr. Severn.**—I had a letter not long ago, from a cousin going out a passenger to Australia, who told me that from the Cape to Bass' Straits, whenever it began to blow smartly from the N. N. W. or N.

W. with thick weather and a falling Barometer, the Captain would open his Chart book on the cuddy table at noon, and explain to the passengers, several of whom understood a little navigation, that a Cyclone was coming up, and that he meant to get a ride upon it, and this he rarely failed to do, and then he would shew them too with the Horn Card how it left them,* and they made a capital run across. As they were only landsmen, and I did not believe in the science myself, I thought at the time it was only some quackery of the Captain's, but I now see it was perfectly correct.

Capt. Wrongham.—Well; we might have thought of this when we were learning to estimate the track. (See Conversation V. p. 43.)

Mr. Severn.—We were all too much engaged, I think, Sir, in looking for defects, or in trying to understand the lesson, to do that. But Mr. Helmsley has got another drawing in his hand I see.

Helmsley Senior.—Yes, this is a drawing which it will be useful for you to consider. Look first at the outside circle, Wrongham, what are all the ships doing?

Capt. Wrongham.—Why, they are taking it easy; for they are all sailing round the Cyclone, safe enough.

Helmsley Senior.—But they are not all in equally safe positions, Wrongham; recollect the Cyclone is moving onwards in the direction of the arrow.

Capt. Wrongham.—Oh, I see; **M.** must look sharp, or he may be caught, if the Cyclone is small and travelling very fast.

Helmsley Senior.—And which is in the *best* position of the four, supposing them all to be well managed.

George Helmsley.—And all bound as their heads lie, Sir?

Helmsley Senior.—Yes. What do you say, Mr. Severn?

Mr. Severn.—I prefer **I.**'s position, Sir, because he has a fair wind and may carry it for some time yet with the Cyclone, especially if he can haul up a little.

George Helmsley.—Very true; I was going to say **A.** was best off, because he and the Cyclone were parting company as fast as they could, but I see he will lose the advantage of it.

Capt. Wrongham.—Well, but H. is not worse off than **A.** or **I.** is he?

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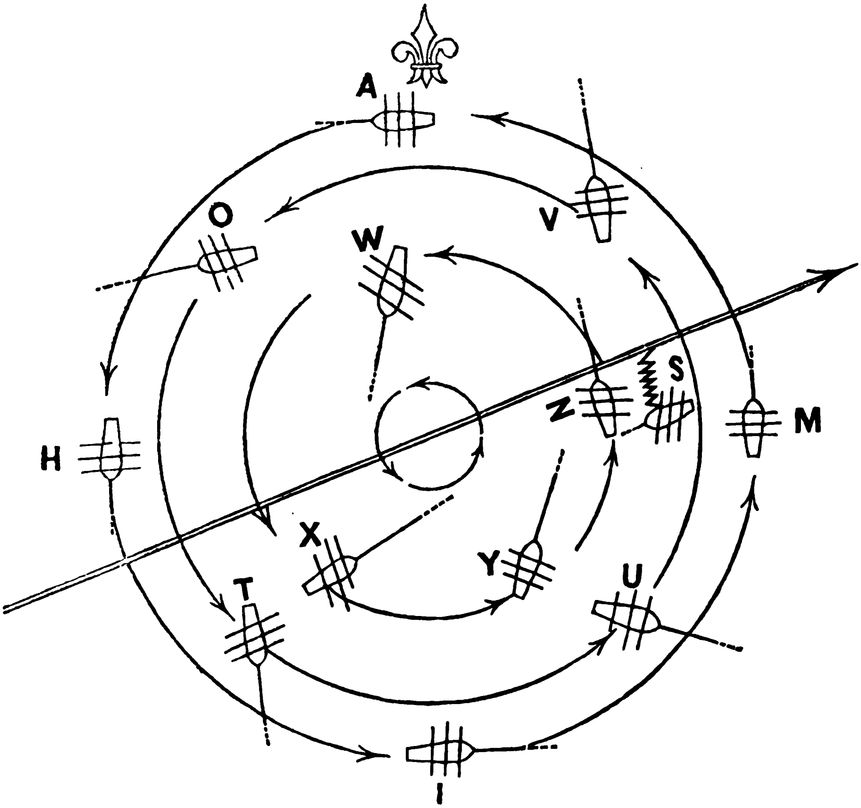
* This is a fact, and has been done by more than one Commander.



**Helmsley Senior.**—Consider a little where he is going.

**Capt. Wrongham.**—Well, that's plain enough, I do not see what is to hurt him, do you, Severn?

**Mr. Severn.**—Yes, Sir; you forget that he has to cross the track where the centre has just passed.

**Capt. Wrongham.**—Oh yes, you mean for the sea it would kick up behind it. Is that it, Helmsley?

**Helmsley Senior.**—Yes, there is always a dangerous sea left in the wake of a Cyclone, remember; and you see each of these four vessels has different considerations to take into account with respect to her own course, the course of the Cyclone and her position on the Cyclone circle. Now here are summaries from the logs of these four vessels, look at their position with regard to all the conditions I have mentioned, while I am reading them.

Log of **A.** *(bound to the Southward.)* "Finding the wind, sea and squalls increasing rapidly, with a falling Barometer, and all the signs of a Cyclone of which the centre is to the South of us, bore up to allow it to pass," &c.

Log of **I.** *(bound to the N. E.)* "Having a Cyclone evidently passing to the North of us. Kept away East to allow it to pass, so as not to approach too near to the centre."

**Note.—If held up to the light this figure is one for the Southern Hemisphere.**

Log of **M.** *(bound to the North.)* "After all due calculation I am of opinion that we are so far in the direct track of the Cyclone to the W. S. W. of us, that we have yet time safely to cross in front of it. All hands called, head braces stretched along, good hands to the helm, hatches battened down," &c. &c.

Log of **H.** *(bound to the E. S. E.)* "As we are evidently overtaking the Cyclone, bore up South to get well on the S. Western quadrant before hauling up, so as not to plunge farther into it. Tremendous confused sea while crossing; no doubt from the wake of the Cyclone."

Capt. Wrongham.—Well, these four are clever fellows, I must own, and are certainly taking excellent care of their ships. What are those in the next circle about? They are all hauling out, as if they find it was getting too heavy for them.

Helmsley Senior.—Yes, that is what they are very properly doing, but only doing it just in time. Here is the Log of **T.**

Log of **T.** *(bound to the E. N. E.)* "Gale and squalls becoming terrific, with a fearful sea and Barometer falling; bore up to run farther out of the Cyclone circle."

Mr. Severn.—That is, he was chasing the Cyclone while he stood on, and overtaking it, Sir?

Helmsley Senior.—Yes, and you may suppose the three others **U. V.** and **O.** to be bound where you like, but you will see at once that they have either got a heavy fair gale for their voyage, or are for the present taking the best and wisest course out of mischief.

Capt. Wrongham.—Well, that makes two sets of clever fellows. What are you pointing out to Severn, Master George? Have you found out any thing to laugh at in your uncle's lesson?

George Helmsley.—No Sir, indeed, I feel the value of it too much for that; but I was asking Severn which of the blundering craft in the inner circle, the friend that told him the new science was "all trash made up by a set of shore-going haymakers and soldiers, to sell their books," commanded?

Capt. Wrongham.—Yes, you youngsters are lucky fellows, now that owners, to make a saving freight, must time their ships to a day for you will *profit* by the storms which used to knock us to pieces, and often make us put back or come in with a damaged cargo. But let us have the logs of all these four fellows, Helmsley, I beg. They are all running into the heart of the Cyclone, I see; or rather they must be too close in to run any farther.

Helmsley Senior.—Here they are!

Log of **X.** *(bound also to the E. N. E.)* " Gale and squalls excessively severe, but the vessel behaving beautifully and steering to a quarter of a point————. At 1 a. m. in a terrific squall the wind shifted to S. S. E. which brought us by the lee. Before the helm could be put over, and the head yards braced round we were driving astern at a frightful rate against the former sea; paid off, but in a few minutes had lost main and mizen masts," &c.

Log of **Y.** *(bound to the N. E.)* "Tremendous gales and sea. At 9 a. m. it fell calm with a sea which was rising in mountain peaks on all sides of us, and running in every direction. Ship perfectly unmanageable. At 11 a. m. a terrific burst of a hurricane came down with a roaring noise like thunder, taking us flat aback. Bowsprit and foremast went in one heavy plunge, and finding the vessel would not pay off and was pressed down with the lee gunwales far below the water, cut away the main mast," &c. &c.

Log of **Z.** *(bound to the N. N. W.)* " Finding it impossible to run any longer, though dead before the wind, hove to on the starboard tack. At 11 a. m. a sudden shift of wind from S. S. E. to N. N. W. taking us flat aback, lost topmasts, boats, forms, and every thing upon deck.

Log of **W.** *(bound to the S. S. W.)* " Running under close-reefed main and foretopsail and main trysail, broached to by a heavy quartering sea, lost topmasts, sprung main and foremasts, three feet water in the hold. Head of the rudder split and two of the rudder pintles gone," &c. &c.

Capt. Wrongham.—Well, if what you have been reading, Helmsley, are not the logs of real ships, they may certainly be taken for them.

Helmsley Senior.—I assure you that nothing would be easier than to find logs of real ships, which would match every one of these either for good or bad management.

Capt. Wrongham.—I can believe that easily, by what I saw in the war time of our fleets of West Indianmen, when the gales, as we used to call them, caught us just outside of the Bahamas, or anywhere between the Florida Coast and the Azores. The history of one of those fleets in which some poor fellows always foundered, and that even in new and well found ships, and with old commanders too, was often nothing but a dismal tale of losses and disasters. You have been convoying us often enough, Helmsley, and George's father too, as you will see by his logs, to know that as well as I do. If the wind was fair we had to crack on her to prevent being pooped or broaching to, and waiting till the convoy brought up the sternmost ships with our deep laden craft was out of the question; so it was devil take the hindmost! If the wind was foul we hove to, and every now and then a poor fellow who could stand it no longer would come flying through the fleet with his signal of distress up.

**Mr. Severn.**—And with topmasts or a lower mast gone, Sir, and all hands at the pumps.

**Capt. Wrongham.**—Yes, but those were glorious old times too for making money, if you got safe in; and the enemy's privateers got mauled as well as ourselves. But you have not told us anything about **S.**, Helmsley. He is lying to, I see, in the track of the Cyclone.

**Helmsley Senior.**—Yes, he is doing as many did in "the glorious old times." He devoutly believes that "you should always heave to in a hurricane," so you see he has done it. Here is his log.

**Log of S.** *(bound to the South Eastward).* "Gale very severe; every sign of an approaching hurricane. Hove to, &c. In a few hours, calm with shift, throwing the vessel on her beam-ends against a heavy sea, and obliging us to cut away mizen mast," &c.

**George Helmsley.**—But if he was bound to the South Eastward, Sir, and had the wind to the South, he could not avoid heaving to?

**Mr. Severn.**—You don't see, he is upon the wrong tack, George.

**George Helmsley.**—True, I ought to have thought of that.

**Capt. Wrongham.**—He ought to have hove to before he got there, I think. I suppose he did not want to lose time, as he thought, while he could carry sail and stand on.

**Helmsley Senior.**—Yes, but putting aside the time he will lose after the shift and its mischief has befallen him, it would have been far cheaper, merely as a matter of pounds, shillings, and pence, to have run back for a few hours.

**Capt. Wrongham.**—Owners don't like that, Helmsley, and then Passengers are apt to make up stories about such manœuvres.

**Helmsley Senior.**—As to the Passengers' stories, I scarcely think any owner would listen to them, at all events if he did he would give the Captain a fair chance for explanation ; and then putting markets out of the question (and they can never be a certain chance ; now that steamers are so common every where), it comes to a simple matter of demurrage for so many hours.

**Capt. Wrongham.**—Demurrage for *hours*, Helmsley! You know it is always fixed at so much per day.

**Helmsley Senior.**—I do not mean Charter-party demurrage, but such as every Captain and owner ought to calculate and allow for in cases like this. Thus suppose a ship sails at the rate of £120 per month, including every expence? that is £4 per day or 3*s.* 4*d.* per hour. Now if we take **S.** to have run back six hours, and even to expend six hours more in getting back to the same position, that is twelve hours, or £2, which the manœuvre has cost his owner, and he has not strained a rope yarn. What will the delay, the new mizen mast, and the racking and straining which the ship has got cost, do you think?

**Capt. Wrongham.**—Well, there is no answering that; if a man paid the demurrage out of his own pocket.

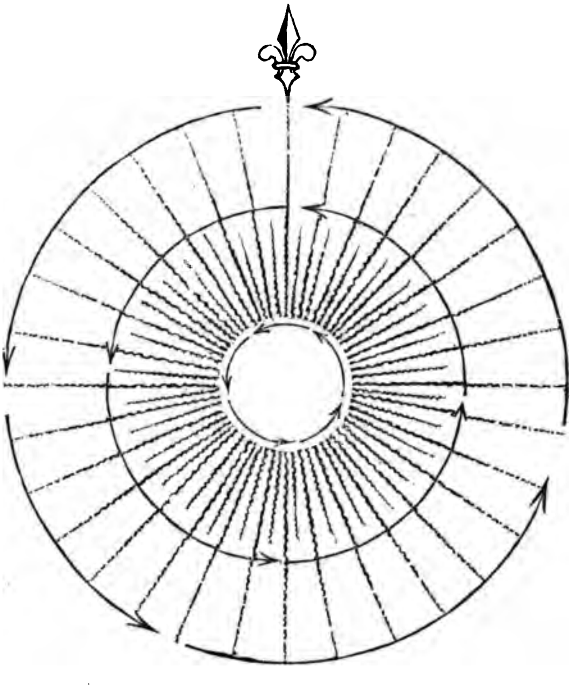
**Mr. Severn.**—I can't help, thinking, Sir, that for a commander to run on rashly in the neighbourhood of a Cyclone for the sake of saving 3*s.* 4*d.* an hour, is as absurd as the steamers that we hear of every now and then, smashing themselves on shore because, as one of their youngsters said to me some time ago, "*they can't waste the time for soundings.*" But you promised to say something about the sea, Sir, if it is not too late to-day?

**Capt. Wrongham.**—I have been thinking, Helmsley, that there cannot be much to say about the sea, which you promised to mention to us; after all every one naturally looks for a gale from the quarter from which he sees a heavy sea coming.

**Helmsley Senior.**—Yes, we used always to do so; but when the gale was a Cyclone and came near at hand, we generally found we were more or less mistaken in our first estimates, if you recollect.

**Capt. Wrongham.**—Yes, that was common enough, and I recollect hearing some of the old hands talk of having some rules for judging of how they thought the wind would come "from the looks of the sea" as they said; but as no two of them agreed, I did not not take much notice of them.

**Helmsley Senior.**—Well, the best way for you to consider this, is to look at this figure in which, instead of the points of the compass, I have marked the seas which the various winds of a Cyclone may be supposed to raise, that is, of course if it is stationary.



**Mr. Severn.**—And they must be more and more confused as they approach the centre, Sir?

**Helmsley Senior.**—Yes, and the motion forwards must also alter the direction of the forces which raise the sea at every moment, though it is only after some time that we begin to perceive it. You may have some idea of this by reversing one of the Horn Cards and then putting one upon the other so as to have its centre a little in advance.

**George Helmsley.**—Why reverse the upper one, Sir?

**Capt. Wrongham.**—Why, to make both the arrows point one way: I can see that.

**Helmsley Senior.**—Then, you must consider farther that each one of these rays does not stop short at any given point, as in our sketch, but sends its wave forwards to cross that of another, and thus that the whole has a tendency, in that part of the ocean which is before the track of the Cyclone, to resolve itself into what we may call *waves of progression,* that is, a wave, or series of waves, making up a sea which is about at right angles to the track of the coming Cyclone before it, and ————

**Capt. Wrongham.**—You say *a* wave, Helmsley, do you mean to say that it is ever traced so far as to where it becomes a single wave? That must be a long way off.

**Helmsley Senior.**—Not quite so certainly, but where the track of the Cyclone—for instance in the S. East trade—is nearly with the wind or not much across it, there have certainly been cases in which in fine weather a few sudden, but heavy, roller-like waves have been felt at very great distances from where Cyclones were actually blowing at the time.

**Capt. Wrongham.**—Oh, you mean rollers? yes, I allow that they sometimes do appear most unaccountably both at sea and in some harbours, and roadsteads.

**Mr. Severn.**—Yes, I recollect that the French in their islands call them *Ras de Maree;* like our word Races. Go on, Mr. Helmsley.

**Helmsley Senior.**—Then—for I can only give you general views which you must think over and work out by your own experience and the study of old logs, when you can get them—you must consider as I before said that the *tendency* of the Cyclone, as it approaches nearer to a ship, seems to be to give a sea compounded of its own Waves of Progression, and of the sea raised by the wind in that quadrant of the Cyclone on which the ship is. This sea may often differ very greatly from the sea which the ship will have a few hours later when fairly engaged in the Cyclone, for at the outer verge of them the sea is often, though high, tolerably regular, till the nearer approach of the centre, and consequently greater closeness of the ridges of sea, necessarily make it more and more confused and sudden, or shorter as we say; as you see in the figure.

**Captain Wrongham.**—Yes, it is those short seas that do the mischief. A ship has no time to recover herself; particularly when she is fairly laid down in a hurricane. But I do not see clearly yet that there is any rule for these seas.

**Helmsley Senior.**—No, it is impossible to lay down any but general views, because the circumstances are so different. Some ships meet with hurricanes in the middle of a fresh blowing trade or monsoon, and have scarcely any interval of calms and variable winds; while others have calms and light squalls with smooth water for a week together before the gale commences. Now it is clear that the sailor must take into account, in considering this matter of the indications of the sea :—*First*, the prevailing winds with him, and those generally blowing in that part of the ocean. *Secondly*, the probable track of the coming or passing Cyclone. *Thirdly*, its probable distance from him; and *lastly* the neighbourhood of land, and any known currents or tides existing in the spot. All these circumstances will contribute to vary the effects of the sea as it reaches him.

**George Helmsley.**—I think the cross seas which come up differently from what may be called the *true* sea, or that going with the wind, may often be seen best from the mast-heads.

**Helmsley Senior.**—Yes, they may be so. And especially on a sunny day with light passing clouds.

**Capt. Wrongham.**—But you have said nothing about the sea behind the Cyclones, though we mentioned it the other day, nor of that at the centre; though I for one know pretty well what that is, now that I understand what the calm interval before the shift of wind in a hurricane means.

**Helmsley Senior.**—It is only necessary to look at the figure to understand that *at* the centre where all the different forces are meeting, the sea must naturally run in huge masses and waves "like boiling mountains" as I once heard it called.* Close behind the tracks too, the sea is in general frightfully confused; and much more so even than on the front portion of the circle.

**Mr. Severn.**—And that is as I see, Sir, because the sea in the rear is already confused by the winds in the van of the Cyclone, where they act upon a new and sometimes even an undisturbed sea.

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* Like "Church steeples" says a Dutch report from the Northern Pacific, received while correcting this page. H. P.

**Helmsley Senior.**—Very true, and the excessively confused and dangerous sea in the rear of Cyclone tracks has often been noticed, and is a capital indication of their passage. They seem also to send back a *rearward* sea to great distances sometimes, and this of course when still farther from the centre, becomes like those in front a sort of rollers, which are only remarked in fine weather, and in tolerably smooth water, or on the coasts and islands which they reach.

**Mr. Severn.**—So that you mean to say, Sir, upon the whole, that the sea is not so much a positive indication as a sign to be taken into consideration with other forewarnings. Is it not so?

**Helmsley Senior.**—That is what I wish you to understand, sometimes several signs of an approaching Cyclone may appear together, and sometimes only one. Thus, your first warning and in the finest weather may be from a slight but gradual fall in the Sympiesometer. Then a strange and formerly an unaccountable kind of sea and the Barometer confirm your opinion, and within a few hours the whole appearance of the sky changes, and the Cyclone commences. Now it is clear that a ship with good warning, in time, has a hundred advantages over one that is taken unawares; and when we get more information we shall, no doubt, be able to predict the weather far more accurately than we do now.

**Capt. Wrongham.**—But the signs of the weather or rather of the wind sometimes contradict each other, I think.

**Helmsley Senior.**—Yes, they appear to do so to some extent, but the contradiction is explained by the new science. Say, that in the Northern hemisphere you have a falling Barometer, the scud flying from the N. E. the wind at North, and variable in squalls and a heavy cross swell coming up between S. East and E. S. E.? You would judge from this, at once, that though the scud and sea were pretty nearly at right angles to each other, the result in a few hours would be a Cyclone coming up from some point between S. S. E. and S. East, or E. S. E. and prepare accordingly; and then, as we said just now, being forewarned you are fore-armed.

**George Helmsley.**—And "half conqueror," too; Hurrah, Severn!

## CONVERSATION VIII.

### PROOFS.

**CAPT. WRONGHAM.**—Well, Helmsley, I think you have made us all fairly understand the new science and its uses, and it is hardly fair to tax your patience any more, but you have promised us more than once that you would shew us or refer us to some proofs of it; and though I fancy Severn and George—and I must add too, myself now—are tolerably well convinced, nevertheless if you will take the trouble to shew us the proofs, we shall be but the more obliged to you. I am somewhat hard-headed you know, as most old sailors at my age are, and the knowledge of the proofs will help to fix what you have been teaching us in my mind.

**HELMSLEY SENIOR.**—Very willingly. I am very desirous you should take nothing on trust from me where questions of life and death and property and reputation are so deeply concerned. Now consider amongst yourselves while I go and fetch a few books and charts and memoranda, in what order you want the different facts to be proved. Put them down on a bit of paper, George. [*Goes out.*]

**MR. SEVERN** [*to Capt. Wrongham*].—Let us see, Sir, what we had better begin with. I think, we should first see what proof there is that the wind really turns in circles.

**GEORGE HELMSLEY.**—And then that these whirlwinds move forward and—then—

**CAPT. WRONGHAM.**—No, next, that they turn differently in different hemispheres, and then as you say, George, their tracks.

**GEORGE HELMSLEY.**—I have put that down, Sir, as you wish. Now I think, we may also ask my uncle for some proofs of cases in which real ships have escaped or run into Cyclones?

**CAPT. WRONGHAM.**—Certainly. Here he is! Hand your uncle the list, George. Now, Helmsley, begin.

**HELMSLEY SENIOR.**—Well, Wrongham, but to know what kind and extent of proof you require, you must answer me a few questions first. How would you be *perfectly* satisfied that an earthquake had been felt all through England and Scotland, for example, though being absent on a voyage at the time you had not felt it yourself?

**Capt. Wrongham.**—Why, I suppose, if it was a smart shock, the newspapers would be full of accounts of it from different places, and people would be talking about it for a long time afterwards; that would be proof enough for any reasonable man.

**Helmsley Senior.**—And if you had accounts of it through France and Germany and Italy, and Sicily, as happening at the same time or a very little later, you would believe it extended to those countries?

**Capt. Wrongham.**—Certainly.

**Helmsley Senior.**—And, of course, that it came originally from Iceland if you could trace it there, and through the Faroe and Shetland Islands to Scotland; and again if you had accurate accounts of the *times* at which good clocks, for instance, were stopped at different places by the shock, you would be quite satisfied that the earthquake took a certain time—that is, that it *travelled* at a certain rate in that time—from one point to the other?

**Capt. Wrongham.**—Certainly: that is simple enough.

**Helmsley Senior.**—And again if from every place all the reports agreed in the main details as to the noise heard, the kind of shock felt, and the like, this too would be sufficient proof of the earthquake's being of the same nature throughout its course, and you would finally have no doubt about the matter?

**Capt. Wrongham.**—No, certainly; who could?

**Helmsley Senior.**—No one indeed; and suppose there were towns and villages in the line of its track, you would say that it *ought* to have been felt there at a given time, and in such and such a manner; and if you wrote to those places for information and found that it really had been so, that would be an additional proof, and in short a full conviction to your mind?

**Capt. Wrongham.**—Certainly, but I can't see what this earthquake has to do with the Cyclone. Yes, you are fancying yourself very sharp, Mr. George. Now, do *you* know?

**George Helmsley.**—My uncle means to tell us, Sir, that he is going to give us the same *kind* of proofs, are you not, Sir.

**Helmsley Senior.**—Yes, George. What I want you all to understand is, that all proof of the occurrence and laws and actions of natural phenomena must depend first upon clear and undoubted evidence of their occurrence, then of their occurring after particular rules at all times, and lastly upon our being able to predict beforehand that certain circumstances have occurred, or that they will occur under given conditions, if the phenomenon takes place. I mean of course those natural phenomena, such as earthquakes, cyclones, hail storms and the like, which we cannot produce or imitate. I am more particular in this than perhaps you wish or expect me to be, because to many, both sailors and landsmen, the very outset and announcement of a science which is to teach how to *avoid* hurricanes, how to *manage* in hurricanes, and even how to *profit* by hurricanes, seems an absurd quackery; and they will not even take the trouble to enquire upon what kind of evidence the proofs of our science rest; though, if they did, they would find that they believe things every day of their lives upon just as little, or less, proof than we can adduce. Let me see; what you want to know first is the proof for the rotation of the Cyclones in different hemispheres, I see by George's list?

**Mr. Severn.**—Yes, Sir. That must first have been found out before the progression on different tracks was known: at least it seems natural to suppose that.

**Helmsley Senior.**—Without stopping to detail the order of discovery, I will say then that the proof of this point rests now upon the fact, first, that in both hemispheres, ships have scudded round and round (in one case in the Southern Hemisphere for *five* successive days!) without falling into the calm centre; sometimes finding themselves close to the spot from which they started, and sometimes being carried away from it by the storm wave. Next that the logs of whole fleets in both hemispheres, when the positions of the ships are laid down, shew nothing but circular winds, and this of fleets of men-of-war, and of the East India Company's ships, the logs of which are quite equal to those of men of-war; and finally that in recent storms from the China Sea westward to the shores of the Atlantic, and in both hemispheres, storm after storm has been traced with the utmost minuteness, as you will see in the works of Mr. Redfield, Col. Reid, Mr. Piddington, Dr. Thom and Mr. Bousquet; and the results from the logs of from four or five ships on the same day, up to as many as fifty or one hundred in Mr. Redfield's beautiful investigation of the Cuba hurricane, and very frequently from ten to twenty or thirty in Mr. Piddington's

Memoirs all shew the same. Now it is beyond suspicion that a single line of this vast mass of evidence should have been made up or distorted in any way for the sake of a theory by gentlemen living in opposite quarters of the globe, and each unknown to the other; and it is beyond possibility that this can be any thing else but the operation of a natural LAW of which as yet we know not the cause.

CAPT. WRONGHAM.—Well, that is one of the objections I thought of.

MR. SEVERN.—George and I heard it made, Sir. The person said it was all stuff, because, said he, if they know as much as that then they *ought* to know what was the cause of hurricanes, and they did not pretend to say they did so; but George silenced that fellow at a word.

CAPT. WRONGHAM.—No fear of his not *trying* to do so at all events. What did you say to him, George?

GEORGE HELMSLEY.—Why, Sir, I asked him if he knew the *cause* of the variation of the Compass.

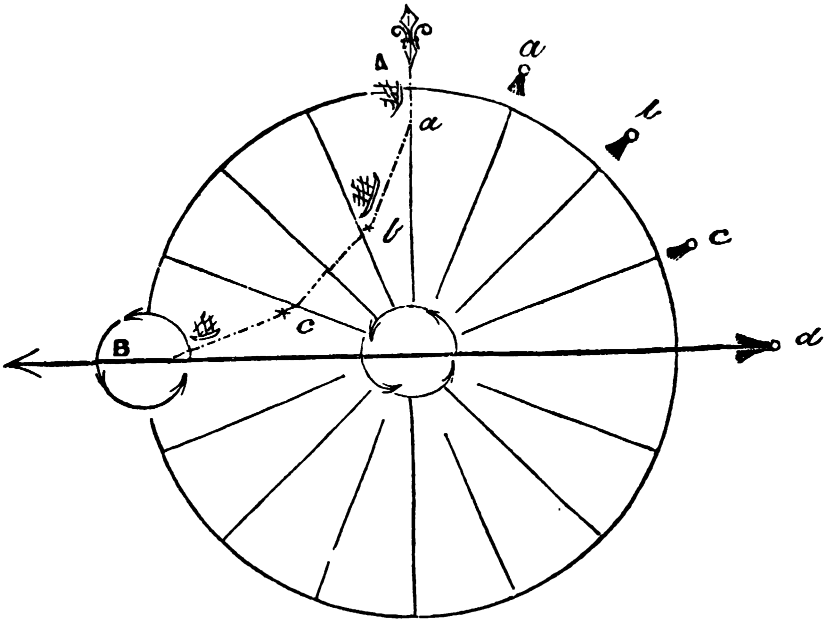
CAPT. WRONGHAM.—Humph! That's a clincher, certainly; and I understand now, Helmsley, why you wished to explain to us the nature of your proofs.

HELMSLEY SENIOR.—Yes, we must in all matters of proof in the physical and natural sciences trust to the evidence of our own senses, or to those of others; and the oftener, and more and more numerously this proof is afforded, the stronger the proof becomes. Tell a native of the Tropics once only about the Aurora Borealis, and he will think it a traveller's tale; when he hears and reads of it hundreds of times, he will have no doubt about it, and if he is told that he will see it in certain latitudes night after night, and does see it there, then he has had the strongest possible evidence for it, and predicts it to others in his turn as a well known phenomenon. This is what we do when we say upon the evidence of a vast mass of research without a single contradiction that Cyclones do blow in circles. Hundreds of persons, for instance, have never seen an electrical experiment or made one themselves, but they have no doubt about the laws of electricity from the testimony of others.

MR. SEVERN.—But I mentioned, Sir, in one of our early meetings, that there were people who argued that the wind did not blow round and round in circles, but inwards from all parts of a circle like the spokes of a wheel. You said, you would explain that when you came to the proofs.

**Helmsley Senior.**—I did so. First, the examples of the vessels I have just mentioned running round and round for days together settle that point; since it is clear that if a vessel scudded so, when she got on that line of wind which is the same as the course of the Cyclone, with the wind blowing inwards, she could only, if she could sail fast enough, scud with one wind right into the centre sooner or later, and there be met by a wind right opposite, or in other words, a wind blowing dead against the course of the Cyclone. Where is the figure you shewed me, George, that Severn and you made the other evening?

**George Helmsley.**—Here it is, Sir.



**Helmsley Senior.**—Now observe that the ship at A. is on the outer verge of a true Cyclone, say in the Northern hemisphere, scudding with the wind at North, and the track of the Cyclone is from due East to West, or from *d.* to B. Now first, let us suppose a Cyclone in spokes to move, so that the centre and ship will just meet at B. it is clear that, as it moves on, it will bring the ship, the winds of *a b c* and *d* successively; that is, that on the right hand side of the track the wind will veer as follows, viz.:

North; N. N. E. or *a*; N. E. *b*; E. N. E. *c*; and East *d*; passing also through the intermediate points, which are omitted for clearness' sake.

And that at B. she will have a gale at East, *at which point she will continue to have the wind steady, and scud* till the *Cyclone has entirely left her.* Now this is all contrary to numerous recorded instances; the true changes for a ship beginning to scud under these conditions, namely, Northern hemisphere, wind North, and track from East to West are, as you may see by your Storm Card, from North through N. West to West, *and then to the Southward of West and ending probably about South-west.*

Mr. Severn.—That is true, Sir, and it seems too that a ship can never scud *round* one of these spoked-like contrivances of Cyclones, for she must reach the centre rapidly, and generally before she has got through more than eight points of change.

Capt. Wrongham.—Why, yes. And if it was supposed to stand quite still, that is, to be a stationary Cyclone, she would have but one wind and reach a centre with it if it did not leave her.

George Helmsley.—But I made this figure to a scale, of sixty miles to an inch, so we can see how far the ship had to run, and what was the rate of the Cyclone's travelling, Sir?

Helmsley Senior.—Measure it then, what is the distance from the centre to B. first?

George Helmsley.—Eighty-five miles, Sir.

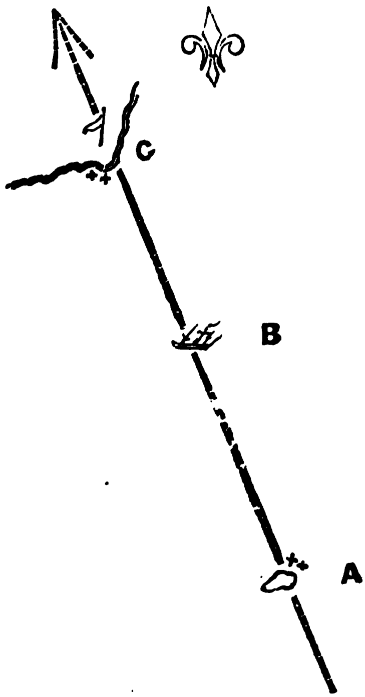
Mr. Severn.—And the curved track is about 130 miles. If the ship was a man-of-war and scudding ten knots per hour only, that gives thirteen hours of run from A. to B. or while the Cyclone was moving to bring its centre to B. or six and half miles per hour, which is no great rate for a Cyclone; though I see they do move at all rates from one and a half mile up to forty-three miles per hour.

Helmsley Senior.—But the proof from the cases of ships lying to in Cyclones, so as to drift exactly into the path of them is still more instructive, and this has also occurred again and again, and above all where centres have passed directly over towns or islands, where experienced and first rate observers have been residing and have published their observations.

**Capt. Wrongham.**—Why, yes, if a Cyclone with its calm centre was to pass over London, or here at Greenwich, we should be pretty sure we were in its track.

**Mr. Severn.**—Yes, and we should get very good information of what that track was too. As to islands they have had the centres passing over the West India Islands, and over the Mauritius and Bourbon also.

**Helmsley Senior.**—And over Calcutta, where good observations were taken of all the phenomena, which have been published; so that there is abundant evidence to satisfy any man of the perfect correctness of the details, all of which are given with scrupulous care. Now supposing a Cyclone travelling up to the N. N. West in the Northern hemisphere, how should it blow at the spots directly on the line of its track, Wrongham?



**Capt. Wrongham.**—N. N. West; that is the Cyclone track *to* the N. N. West you said? Here, give me the Horn Card: I see, E. N. East.

**Helmsley Senior.**—And remains so, as you see, till the calm centre reaches all the different points as A. B. C. on its route?

**Capt. Wrongham.**—Of course the wind must be athwart the front of the track.

**Helmsley Senior.**—That is at right angles to it, as we also say; and how will it be when the shift takes place?

**Capt. Wrongham.**—W. S. West of course; that is very clear by the Card.

**Helmsley Senior.**—So the shift is end for end or dead an end, as we say, but *athwart* the track? Now, Mr. Severn, how will it be if, according to your friend's ideas, the wind is blowing in rays or spokes to a centre as in the figure we were just considering? (page 79).

**Mr. Severn.**—Let me see. It is end for end too here.

**George Helmsley.**—Yes, but the shift is from West to East, and the track is in the *same line*, not at right angles. Oh, Severn! what a pity you and I had not had this ready when those fellows were arguing with us.

**Capt. Wrongham.**—No fear of you, Mr. George, you are saucy enough already. But I must say you learn faster than any of us, and I see now, at once, that the tracks of storms being known in so many parts of the world as they are, and this fact of the shift being at right angles to the track instead of along the line of it, and that of the many vessels who have scudded round and round; to say nothing of the known changes of wind proved by so many logs; at once settles the question of the wind blowing in circles and not in rays towards a centre. Who first set that notion afloat, Helmsley? Was he a sailor?

**Helmsley Senior.**—No; it was Professor Espy in America, who published a thick book to prove it, and he was supported by Professor Hare, also an American, but I think they were a good deal misled by shore registers of the wind, and by making their Charts on too small a scale. No doubt, they were misled by something, and wrote conscientiously at the time. Of late years, we have heard nothing of this theory; but it is a pity they have not publicly renounced their erroneous views after the mass of evidence which has been published on the subject. Here is a list of works and papers to which you may refer if you have any doubts of the wind always blowing in circles in Cyclone storms, in both hemispheres, and that it blows from right to left in the Northern, and from left to right in the Southern hemisphere.

### List.

1. Mr. Redfield's various Memoirs in the American Journal of Science and English Nautical Magazine; particularly his paper on the Cuba Hurricane of 1844, for the Northern hemisphere.
2. Col. Reid's Law of Storms, both hemispheres.
3. Mr. Piddington's twenty Memoirs in the Journal of the Asiatic

Society of Bengal from 1839 to 1851, for both hemispheres; and in one instance (Eleventh Memoir) for both hemispheres at the same time! The *Charles Heddle's* Cyclone, (Thirteenth Memoir) is reprinted in the Nautical Magazine, Vol. for 1846 p. 156).

4. Dr. A. Thom's Inquiry into the Nature and Course of Storms, for the Southern hemisphere.

There are many more, but these will amply suffice to convince any impartial man.

**Mr. Severn.**—You said, Sir, in speaking of the earthquakes, (at p. 84,) that it would be an additional proof if we stated that the earthquake should have passed *(ought* to have passed) certain towns and villages on its track and we found afterwards that it was so; what relation has this to the proofs of the manner in which the Cyclones blow and travel?

**Helmsley Senior.**—It has this relation: that, as regards Cyclones in many instances, long after the track of one is laid down, the logs of other ships are procured, and when their positions are laid down on the Chart, the winds they have had are found exactly to agree with the facts already shewn by the former investigation; i. e. that the wind was blowing in circles, and these circles moving forward. Now this after-knowledge or after-discovery as it ought be called, is exactly a proof of the highest possible order.

**Mr. Severn.**—You have used the word after-knowledge, Sir, and that reminds me that this was another of the arguments which I have heard used against the new science: namely, that it was all very well as a theory founded on after-knowledge, but could not be of use to direct a ship before hand.* It was said that we had on shore all the circumstances from beginning to end of the hurricanes before us to form our judgment upon, whereas the Captain of the ship saw only the beginning of a gale, and had then to guess at all the rest.

**Capt. Wrongham.**—I wish the fellow that said that, had heard all these conversations: but I am interrupting you, Helmsley.

**Helmsley Senior.**—Your friend, whoever he was, did not consider first, that all after-knowledge as to what must have happened or what *will* happen in certain cases, depends upon fore-knowledge of what *has* happened; the one being so to say manufactured out of the other, and then in its turn furnishing the material by which exactly, or pretty nearly so, more fore-knowledge is manufactured.

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* See Naut. Magazine, Vol. for 1849, page 259.

**Capt. Wrongham.**—That I see: All our knowledge is a sort of twice laid stuff; but give us a good example of it Helmsley, that I may be able to silence some of these chaps if I can come to an argument with them; as I am sure I shall, now that I understand the matter a little more than I did when I was so angry with Severn's examiners.

**Helmsley Senior.**—Willingly. Here is a Chart of the Northern Pacific from 40° North to the Aleutskoi Islands, and within them to Bhering's Straits, and it is a part of the Ocean regarding which we have not a word of information as to its Cyclones. Now, Wrongham, if you had the log of a whaler in a heavy gale there laid before you, what would you all first think of in considering if it was a Cyclone?

**Capt. Wrongham.**—I should look to see how the wind veered.

**Helmsley Senior.**—No, you would think of something before that. What is it?

**George Helmsley.**—If the ship scudded or hove to, Sir. No, stop, I see by Severn's holding up the Northern Horn Card, we should think first that it was a storm in the Northern Hemisphere.

**Capt. Wrongham.**—Well, but we *know* that already.

**Helmsley Senior.**—Yes, but that includes all the fore-knowledge you have of what a storm (that is, a *Cyclonal* storm) is in the Northern hemisphere Wrongham, or in other words you are using then all that mass of your fore-knowledge, and almost unconsciously too as you see.

**Capt. Wrongham.**—Well, that is true. But now I should consider after recollecting it was in the Northern hemisphere, how the wind veered, and if the ship was scudding or lying to.

**Mr. Severn.**—And in the consideration of all that, you would still be using the fore-knowledge again, Sir.

**Helmsley Senior.**—Well, and when you had laid down her track or drift, and considered it with the winds at different hours as marked in the log? ————

**Capt. Wrongham.**—I could then get a good notion of the track of the Cyclone itself.

**Helmsley Senior.**—So, you see, you would have used some fore-knowledge to get a little after-knowledge for this time. And you would have done all this too, if you had been on board the ship, till you formed some estimate of the *track;* and if you had another log brought to you of another ship's suffering from a Cyclone thereabouts, you would look to see if that also was a case in which, for instance, the track was from N. West to S. East like your own, and if you found it was so, you would then have another step in your fore-knowledge to use for obtaining more after-knowledge; and when a great number of logs and tracks had been laid down, you would end by expecting and even predicting before-hand that certain events would take place if a Cyclone occurred there, and feel pretty confident about the management of your ship if you commanded one there.

**George Helmsley.**—And that would warn all the ships frequenting those seas of what was to be expected, Sir, so that it would be fore-knowledge, producing fore-knowledge, would it not.

**Capt. Wrongham.**—It certainly would not be, as Severn's friends seemed to think, after-knowledge of what was proper to be done for any ship, if she knew it was a Cyclone and knew its track.

**Helmsley Senior.**—And, if you went on accumulating logs and laying down tracks, you would end as you see in these Charts of the West Indies and Atlantic, the Southern Indian Ocean, Bay of Bengal and China Sea, by informing seamen to a very high degree of probability what the tracks in different months of the year were.

**Capt. Wrongham.**—So that our knowledge then would all be fore-knowledge, both as to what had happened and what in all probability was going to happen. Well! that is certainly different from the time when we could only say that we were going to have a gale, and guess that the wind would veer so and so, in which the oldest and cleverest of us was often mistaken, but I think now that with a good look out on the signs of the weather one can scarcely be caught unprepared.

**Helmsley Senior.**—That last remark of yours is perfectly just, Wrongham. It has been truly remarked that *the signs of the weather were the Barometers of our forefathers,* and in one of the books on this new science, the Horn Book, there are tables drawn up of these signs which precede Cyclones in various parts of the world, and very curious they are.

**Capt. Wrongham.**—I know that in future I for one shall take more pains to set them down than I have done. But we have got something else on the list. What is it, George?

**George Helmsley.**—We said we would ask for some particular cases of ships running into or avoiding Cyclones.

**Mr. Severn.**—Yes, but Mr. Helmsley has scarcely told us how the tracks have been laid down, that is, how it is proved that the Cyclone moves forward, when it is turning round.

**Capt. Wrongham.**—Well, Severn, it is you that are getting hard-headed now. Can't you see that it is from the logs of the ships on the same or following dates, and by the shore registers that this is proved?

**Mr. Severn.**—Yes, Sir, I know that perfectly, and I know that the *kind* of proof is exactly that of the earthquake shock, as Mr. Helmsley explained to us; but I wished him only to give us some good instances of the cases where it is credibly proved: so that we could quote them in the many arguments, one hears about this matter.

**Helmsley Senior.**—Nothing can be easier than that, and the only difficulty is the choice. You will see in all the works I have just mentioned, (page 90) what I may call overwhelming evidence to the fact of the regular progress of the Cyclone like a great whirlwind (which in fact it is) not only at sea, but in the West Indies from Island to Island, and along the Coast of North America to Nova Scotia, Newfoundland, or the Bermudas, as to the centre passing various points at perfectly well-registered hours and dates. In the East Indies and China Sea, again the fact of *the same* Cyclone travelling over vast distances, has been proved over and over again beyond any controversy or question.

**Capt. Wrongham.**—I observe, that you say somewhat forcibly *the same* Cyclone, Helmsley. Now this is, I confess, the only difficulty that I can think of, and I was making up a question about it in my mind to put to you. But I think too, looking at the Chart again, I know how you will answer it.

**Helmsley Senior.**—There can be no difficulty in the belief of a Cyclone's being the same Cyclone, if we find it at successive hours beginning with one wind, then after a steady hurricane bringing the calm centre, and then the shift with the hurricane at the opposite quarter following; when this takes place at shore stations on Islands, and where there is no doubt about the position ; but taking the most difficult form of the question, which is in a wide open ocean with no land observations, there is abundant evidence, for instance in the work of Dr. Thom, which treats of the Cyclones of the Southern Indian Ocean as well as in those of Col. Reid, and the Memoirs of Mr. Piddington, where they speak of that Ocean, and of the Bay of Bengal, and China Sea and Pacific, to shew that the progression upon given tracks has been proved again and again in the fullest manner by fleets of detached ships, certain of their position within a few miles, and bound opposite ways being overtaken by an edge of the Cyclone, whilst others were at its centre, and others again were just clearing or being left by it, and there are also instances of ships running on for days in company with a Cyclone, which at a short distance from them was dismasting ship after ship which happened to be in the way of its centre.

**Capt Wrongham.**—So that the ship running on was like a keeper running after a madman, but with no power to prevent him doing mischief to those he met with ?

**Helmsley Senior.**—Yes, and the value of the fact for us is, that we find one or more ships doing this safely for days, while others are successively made wrecks of, by the fury of the Cyclone. I had rather you looked for yourselves into any of the books I have named than give you now the details, because the more you examine these for yourselves the more you will be satisfied of the minute and conscientious care which is taken to admit no evidence but at its just value, and in many instances the full ships' logs are given, so that the sailor can judge for himself.

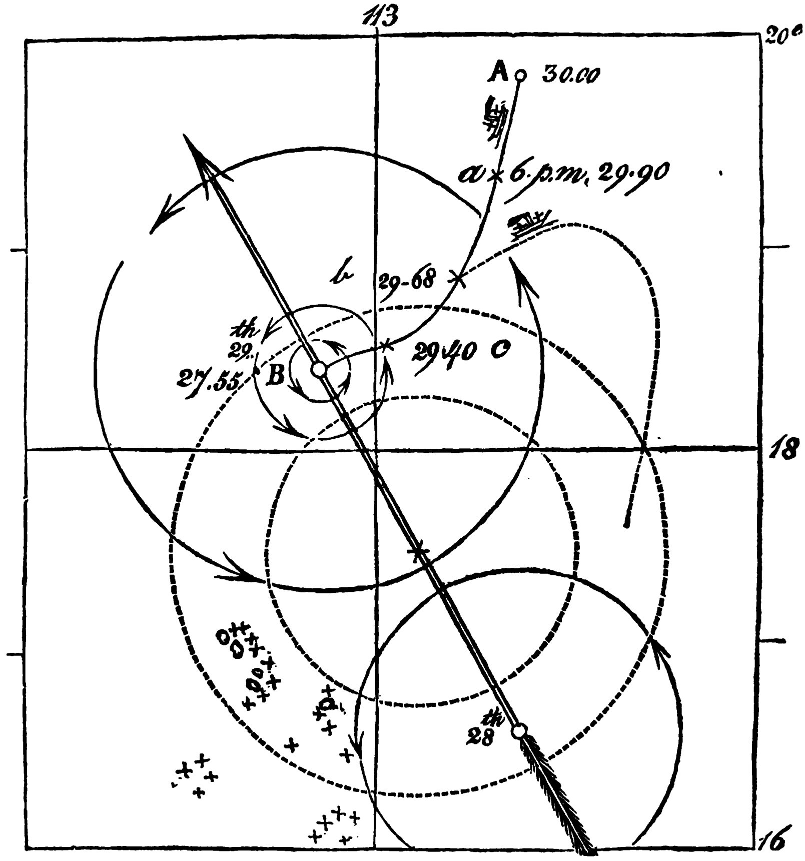
**Mr. Severn.**—Well now, Sir, we have only to trouble you for a few instances of real ships.

**Helmsley Senior.**—You shall have as many as will quite satisfy you. Here look at this sketch. (in the next page.)

This is the case of the *Pluto* Steamer in the China Sea in the month of June, 1846.

**Capt. Wrongham.**—What ? a Steamer ! why, she could hang on where she pleased ; was any thing the matter with her engines ?

**George Helmsley,**—But, perhaps, Sir, she did not know how to go, or what was coming, and if so ———



Mr. Severn.—Let Mr. Helmsley go on, George.

Helmsley Senior.—Well: the *Pluto*, one of the E. I. Company's war steamers, left Hong Kong on the 27th June, 1846, bound to Laboan, to which port her course was about S. b. West for the first part of her voyage. She was at noon of the 28th at A. in the accompanying sketch in Lat. 19° 49′ North; Long. 113° 45′ East; with the wind from E.N.E. to East and S. E. Her Barometer at this time was at 30.00; but it fell by 6 P. M. to 29.90; and by midnight to 29.68; so that the fall was one-tenth in the first six hours, and 0.22 (twenty-two hundredths,) or something more than double the previous fall, in the second of these six hours.

**Capt. Wrongham.**—And this was in the S. West monsoon in the China Sea too, Helmsley! Why, if we get the trade reversed in the West Indies, we are always looking out for squalls, at least; and for a blow if it be in the hurricane months! Well, go on.

**Helmsley Senior.**—The *Pluto* continued to steam on, apparently quite unconscious of the mischief she was running on to meet, making about the track from A. to B. which you see laid down in the sketch, reaching B. about noon of the 29th; her Barometer falling as you see marked against the track at *a* and *b* and *c*, and the gale increasing to a terrific hurricane.

**Capt. Wrongham.**—To be sure it did! what *could* they be thinking of? why George here would not have done that, and in a steamer too.

**Mr. Severn.**—That is *now*, Sir, that we all know better—but what took place at the centre, Mr. Helmsley?

**Helmsley Senior.**—What *should* have taken place, Mr. Severn?

**Mr. Severn.**—A calm and shift to the S. Westward, Sir, with the sea even worse than before, the vessel being thrown against it.

**Mr. Helmsley.**—Exactly so, and this is what *did* occur; and she lost her funnel, rudder, &c. and was very nearly foundering when the Cyclone left her. She then put back, but being unmanageable drifted on the rocks at Hong Kong, and was nearly lost but for the assistance of the boats of the *Vestal* frigate, then lying in the harbour.

**Capt. Wrongham.**—It is not difficult to see that she forced herself into the mischief which befell her; for a sailing vessel could not have reached so far in to the very centre in so little time; but now, let us consider what she ought to have done.

**Helmsley Senior.**—Look attentively at the sketch, Wrongham.

**Mr. Severn.**—And we have to consider also which way he was bound.

**Capt. Wrongham.**—He was bound to the S. b. W. or S. S. W., at least, till he was past the Paracel Shoals, so that he could not run to the Westward to cross in front of it for the shoals; and for a steamer on a short trip that would perhaps have taken him too far out of his route even if he had the sea room. Why did he not heave to?

Mr. Severn.—But then he might have done so and been right in the track for any thing he knew, since, as we have seen, the estimation of the track is always uncertain, say to a point or two.

George Helmsley.—But he could have steamed back, could he not? before the gale became too heavy for him to make way against it?

Mr. Helmsley.—Yes; and that is what he ought to have done. Make a curved line, starting at midnight even, at *b* from his present track, as I have done here, leading it gradually round till the vessel regains her former course of S. b. W. or S. S. W. and you will see that it would not have taken her really more than fifty or hundred miles out of her road to have escaped all this danger and damage.

Capt. Wrongham.—Yes, and I see another thing, which is that even if he had succeeded in pushing through one half of the Cyclone he would have been, even in a Steamer, obliged to lose all he might have made, or in danger of his machinery giving way, in the tremendous South Westerly and Westerly gales in the other half of the storm circle.

Mr. Severn.—That instance is clear enough. Will it give you too much trouble, Sir, to give us briefly the details of the *Charles Heddle's* hurricane, which, as you said, was such a beautiful experiment?

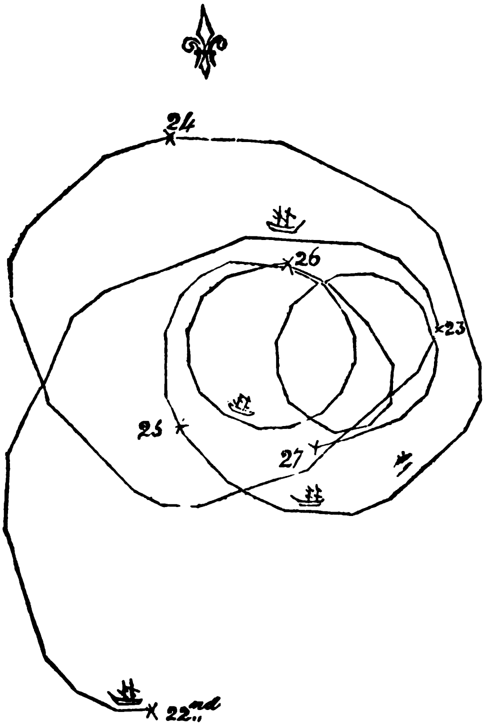
Mr. Helmsley.—I meant to do so, to give you an instance also of the Storm Wave in a Cyclone.

George Helmsley.—What was the *Charles Heddle*, Sir?

Mr. Helmsley.—She was originally a prize slaver, and of course a fast sailer, but at the time of her extraordinary performance she was only a Mauritius Colonial brig, generally employed in the cattle trade from Madagascar and Muscat to that colony, she had then but a small trader's crew on board, but her Captain, a French Creole named Finck, was evidently a first-rate seaman, for no man of war could have been handled better than she was. "The hurricane," says the log "began to make itself felt" from E. S. East about noon of the 22nd of February, 1845, when the brig was at 210 miles about N. b. East from the Mauritius, which she had just left, being bound to Muscat; and she then started off to scud before it; probably, because being in ballast, Captain Finck did not deem it safe to lie to.

Capt. Wrongham.—What sail had she set?

**Helmsley Senior.**—Reefed foresail and close-reefed foretopsail at first, but before the next day every thing had blown away, including the foretopmast stay-sail, and the vessel scudded under bare poles for the rest of the gale; making from noon of the 22nd to noon of the 27th by log, the traverses shewn in this figure,



in which the vessel's position is marked each day by the date. The scale is one of sixty miles to the inch.

**Capt. Wrongham,**—Well, George, your notion of the moth scudding round the candle the other day was not so bad a one I own, when one looks at this. But how do we know that all this is true, and not a flourish of the Frenchman's?

**Helmsley Senior.**—Fortunately, next to having seen the log and the vessel ourselves, we have the next best evidence for it. The log was copied by Captain Royer, R. N. then Master Attendant at the Mauritius (to whom of course Captain Finck was perfectly well known), and in his own hand writing to avoid mistakes. It was sent to Calcutta to Mr. Piddington, as a highly curious one, and it is from his memoir on this hurricane, in the Journal of the Asiatic Society, that these cuts are reduced.

**Capt. Wrongham.**—I beg Capt. Finck's pardon; but it *is* so wonderful that short of such evidence one is puzzled to believe it.

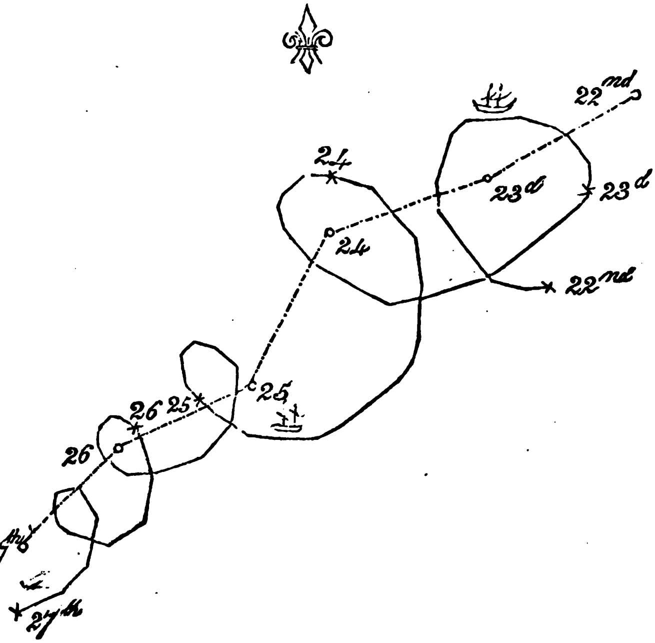
**George Helmsley.**—If we had met with it in a novel, Sir, we should have said the author was not a seaman, or was exaggerating absurdly, and making fools of himself and his readers.

**Mr. Severn.**—But there it is, sure enough ; but is the storm wave allowed for in this cut, Sir?

**Helmsley Senior.**—No, this is only a plane Chart of the distances run per log, with the courses corrected for the variation, and according to it, as you see, the vessel made at the end of all her turns, that is from the 22nd to the 27th a course and distance of *North* 42° East 111 miles; but then it was found by good sights, for the Chronometer, which had not been injured in the hurricane, and was perfectly correct when the vessel returned to Mauritius a few days afterwards, having put back, that the course and distance really made since noon of the 22nd was *South* 50° West 366 miles. So that she must during the five days have had a current of S. 52° West, 476 miles, or in round numbers (which would require 480 miles) of four miles per hour, for these 120 hours or five days of hurricane!

**Capt. Wrongham.**—But it might not have been at the same rate throughout, Helmsley?

**Helmsley Senior.**—It probably was not; but we can only take the average. When all the courses and distances are corrected for this current, and the real track made is projected on a Mercator's Chart, here is the singular set of curves which it makes, the dotted line being the track of the Cyclone from day to day.



**Capt. Wrongham.**—Why, that is like the fakes of a coil of rope hauled out!

**Mr. Severn.**—Yes, Sir, but that is the sort of turns which the Brig *must* have made as she was carried forward with the vortex, while scudding round and round it without running into the centre.

**Capt. Helmsley.**—Well, Helmsley, I must say that this instance ought to satisfy any one.

**Helmsley Senior.**—You will find the whole log and the very curious calculations based upon it, regarding the size of the vortex, the distance the vessel was from the centre, the proof that there *must* have been a strong wave, carrying her onwards, and the great probability that the wind curves inwards near the centre of Cyclones reprinted in the Nautical Magazine for 1846, page 427, and you will lose no time, I assure you if you study carefully every line of it.

**Mr. Severn.**—But I am thinking, Sir, that there must have been such instances before. We know at least of vessels scudding one or two turns, or even more in a hurricane.

Helmsley Senior.—Yes, but no one can, or will it seems, bring forward their logs, though they would be of very great interest, especially if like the *Charles Heddle*, they were enabled to verify their Chronometers by an early arrival in port; for it is this, and the certainty we have of the log's being perfectly genuine, which completes the evidence of all which it proves.

Capt. Wrongham.—Very true, and very fair argument, Helmsley, I must say; but now give us some instance of a real ship, as the landsmen say, keeping out of a Cyclone because her commander knew exactly what he was about, and what was coming; as I hope, Severn and George will now.

Helmsley Senior.—I will do more than that, Wrongham, I will give you an instance where the chief mate of a first rate East India passenger ship did all you ask for; his Captain having been left ill on shore at Madras.

George Helmsley.—How long ago is that, Sir?

Helmsley Senior.—It was in October, 1848, and to give you an idea of what the Cyclone was, I should tell you briefly that we have the best authority for all the details of it in a Memoir published in Calcutta by Mr. Piddington, in which the logs of twenty-two vessels are given in full detail, and from them we learn the curious fact that the management of the ships which were all in the Bay of Bengal between Lat. 15° North, and the Sandheads was as follows:—

| | |
|---|---|
| At a distance from the Cyclone, but well managed in anticipation of it, | 2 |
| Ran in too far before heaving to, | 2 |
| Suffered more or less, but unavoidably so, | 1 |
| Ran into, or with the Cyclone, or laid to in the way of it, but escaped with severe straining, | 5 |
| Dismasted by running or standing into, or chasing the Cyclone, | 5 |
| *Perfectly well managed by their knowledge of the Law of Storms,* | 6 |
| Well managed from necessity, | 1 |
| Ships and brigs known to have foundered exclusive of coasting craft, | 7 |
| | 29 |

**Capt. Wrongham**—Well, if all this was published in Calcutta and in England, the Captains of the ten ships stated to have mismanaged somehow or other, and especially those of the five dismasted ones, would not be over well pleased I should think. I know I should not.

**Helmsley Senior.**—Doubtless they would have been better pleased to have found their names amongst those of the six ships which were perfectly well managed, but there is nothing said in the Memoir, which any man of sense can fairly take offence at. All that is expressed is .that they misunderstood or were ignorant of their position, and some of them by the way were in the hands of their Pilots, having put to sea from the Sandheads of the Hooghly; where remaining at anchor in a gale, if it can be avoided, is out of the question. The advantage of this publication for us however, or rather for all Sailors, is the perfect authenticity of the documents, that is, of the Memoir and its Chart, which being published in Calcutta under the eyes of the Commanders themselves would be closely examined and canvassed, and if a line was found incorrect the author would soon have been told of it.

**Capt. Wrongham.**—No doubt of that. Well, go on now, pray do tell us about the ship which was so well managed by her chief mate.

**Helmsley Senior.**—It was the ship *Barham*, Captain Gimblett from England to Madras and Calcutta, which left Madras on her voyage to Calcutta under the command of Mr. Vaile, then her chief officer. She found as she stood to the Eastward and N. Eastward on the 10th and 11th of October, that all the usual signs of a Cyclone were increasing, that is, a heavy swell, a red sky, a remarkable kind of lightning, the Barometer very unsteady, and gradually falling, and the wind N. Westerly and unsteady. By noon of the 12th when in Lat. 16° 51′ North; and only about 240 miles from the Light Vessel at the Sandheads, the Barometer had fallen to 29.40 from 29.72 on the 10th; and the squalls and rain constantly increasing in violence. Mr. Vaile then very properly hove to, informing his passengers, and this is what is remarkable, *why he did so*, and pointing out to them on the Chart, where the Cyclone was, and how it was probably moving, so as to render it imprudent to run on though the wind was rapidly becoming fair for them.

**Capt. Wrongham.**—At which he had plenty of grumbling, no doubt.

**Mr. Severn.**—Yes, and some little sneering at him too, I dare say.

**Helmsley Senior.**—There was certainly grumbling and not unlikely sneering, but it did not last very long, for after lying to for thirty hours he ran in a little way, but the weather being still dangerous in which to approach the Sandheads, he hove to again, and finally on the 16th after standing again to sea by the Pilot's orders the good ship came safely in *amongst wrecked and disabled vessels,* without having strained a rope yarn in the midst of all the loss and mischief about her. The grumblers being perfectly satisfied by the sights they saw, of what they had so narrowly escaped.

**Capt. Wrongham.**—And well they might be. In your list you say there were six ships perfectly well managed in this hurricane.

**Helmsley Senior.**—Yes, but it is not necessary to quote more than one instance; to understand which you must recollect our conversations on the uses of the Storm Cards, and on scudding and heaving to (p. 50 to 60), and here is the sketch which I shewed you (in Diagram p. 38) but it is a little altered as a lesson, though not in any thing material from this one which is the correct one.

It shows the tracks of the ships *Fattle Rozack* again outward bound, and the *Collingwood* troop ship, inward bound, to Bengal, beginning at noon of the 12th of October with the places of the centres and the track of the Cyclone, and also the Lighthouse at *False Point* on the coast of Orissa.

**Capt. Wrongham.**—Yes, I recollect this in the case of ships passing on different sides of a Cyclone, both making a fair wind of it, but the one by due attention to the weather, and his correct knowledge of the Science carrying his ship in safety through a most perilous difficulty; and the other——

**Mr. Severn.**—Because he did not *believe* in the Science, Sir?

**Helmsley Senior.**—Well then, because he did not believe in the Science, carrying his ship into extreme peril against all warning by overrunning the Cyclone, with the heavy penalty of being totally dismasted, for he drifted with the Easterly part of the Cyclone from the position (3) into seven fathoms of water on the coast, and had to anchor there. If the gale had lasted a few hours longer the chances are that he

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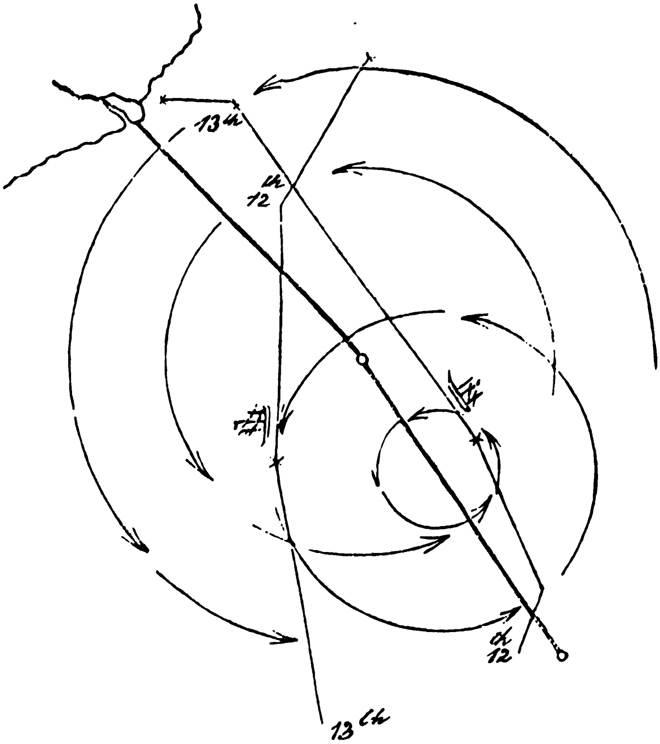

could not have rode it out in such an exposed situation. The Memoir, describing a separate diagram of these two ships, says, it is one "of the ship *Collingwood* running up on the Eastern and North Eastern quadrants of the Cyclone, and in fact overrunning it on to a lee-shore! and losing her masts in so doing; and of the *Fattle Rozack* crossing in front and making a fair wind of it, while it was dismasting the *Washington Alston*, *Hope** and other vessels which left their pilots with her or about the same time." And again, "These two ships it will be seen were passing each other at about seventy-five miles distance, and on opposite sides of the Cyclone, both carrying what sail they could shew, but at midnight 12th and 13th Oct. (at the ✕ on the Diagram on the right hand ship's track) the *Collingwood*, a first rate English ship, with troops on board, was running in full career into the very jaws of destruction! and the *Fattle Rozack* a deeply laden rice ship, and a poor sea-boat, with a new lascar crew, was making her way as surely as scientifically into fine weather without straining a rope yarn! as shewn by the left hand ship's track. And now, George, tell me with the Storm Card what was the *Collingwood's* safe course? she being, as you see by the chart, 205 miles from the Light Vessel at noon on the 12th, the weather in the course of that afternoon squally and variable with a falling Barometer, till it settled at 10 P. M, to a S. E. b. S. gale with all the other signs of a Cyclone, the usual tracks thereabouts being from the S. East to the N. West.

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* This vessel foundered.

**George Helmsley.**—Why, Sir, being on the N. East quarter of it heaving to, or hauling out for a few hours, seems all that was required to be done for her.

**Capt. Wrongham.**—Very well, youngster; but now suppose the wind had gone on increasing and the Barometer falling, and yet held steady to the S. Eastward while you were hove to?

**George Helmsley.**—Why, then, Sir, the Cyclone would have been coming to the N. East from the S. West towards the ship, and I might still have put my helm up and crossed in front of it, so as to heave to out of the way of the centre at all events, and without risking myself too close in to the lee shores of the Sandheads.

**Mr. Severn.**—That is clearly what was to be done, but I suppose the Captain wished to profit by the fine fair wind he had.

**Helmsley Senior.**—You are probably right in that supposition, Mr. Severn, and it is no doubt the "not throwing away a fine fair wind" which is so contrary to all our old sailor feelings, which proves the inducement to many to push on; shutting their eyes to the risks of doing so, and not calculating, as we did a short time ago, how little expence the few hours' demurrage really is, in which by running or heaving to they can be assured of what kind of a gale they are involved in; and, if it is a Cyclone, which way it is travelling.

**Capt. Wrongham.**—Yes, but they will do that but once when they have found out their mistake.

**Mr. Severn.**—Another thing strikes me, Sir. I can fancy a case in which a ship may be lying to in a gale of wind with her Captain very desirous of pushing on, and every body on board very angry at the gale blowing so dead against them ; and yet this gale may be providentially on that quarter of the Cyclone which just prevents her *from* running into it, and losing her masts or even foundering!

**HELMSLEY SENIOR.**—Yes, such cases have frequently occurred no doubt, and instances of them are mentioned in the books on the science. You can now easily make cases of the kind for yourselves by making a mark for a ship, and supposing her bound in any direction, so that she will have a foul wind by the storm card which prevents her also from crossing the track of the Cyclone.

**CAPT WRONGHAM.**—That is easily done, now that one understands it, but it seemed all Greek to me before. You young fellows set out with a fine advantage in this, I must say.

**MR. SEVERN.**—And I trust we shall profit by it, Sir. I have now to thank Mr. Helmsley very heartily for his kind explanations, for I passed my examination yesterday, and had some compliments paid me for understanding the matter so well.

**CAPT. WRONGHAM.**—Why, you said nothing about that, Severn.

**MR. SEVERN.**—No, Sir. I was desirous of thanking Mr. Helmsley, when he had entirely concluded.

**HELMSLEY SENIOR.**—I feel happy to have been of any service to you, Mr. Severn, but in return I have to request a service from you and from George, and my new convert here, Capt. Wrongham.

**MR. SEVERN.**—We shall all, I am sure, Sir, be most happy to do anything you ask, if in our power.

**HELMSLEY SENIOR.**—It often will be so, I have no doubt, and it is in truth more a service to yourselves who go to sea, than to one who lives on shore now, that I ask. It is this. You have noticed in the course of our conversations that I have often used the words "so far as we yet know," or "so far as the tracks are known," and phrases of that description; intimating that for many parts of the world our new science is yet a blank as to the signs which precede the Cyclones, the seasons at which they occur, their tracks, and an infinity of other particulars which the sailors alone can furnish for themselves; and I regret to say that one of the main obstacles to the full developement of the science, even as it now stands, is the incredible indifference of many of the sailors themselves; or, worse than that, their positive and open dislike to it, and refusals to grant any information tending to advance it; as, for instance, neglecting or refusing to give copies of their logs.

**Capt. Wrongham.**—Why, you do not mean to say, Helmsley, that any man asked for his log, or for a copy of it, when he has had bad weather refuses or neglects to give it?

**Helmsley Senior.**—Yes, I regret to say that nothing is more common than for such requests to be treated with neglect.

**Capt. Wrongham.**—Well, I suppose they are ashamed of their logs, that is all.

**Helmsley Senior.**—Be the motive what it may, the fact is undoubtedly true, and we have constant complaints of the difficulty, not to say impossibility, of procuring logs, or extracts, or copies from them: and I repeat that the best service you can render, next to careful observations of your own when bad weather is approaching, or rather in all weathers, is to collect logs, the more detailed and complete the better, for those who are still at work carrying on our present knowledge to completion. A single log may seem at first of small importance, but it may turn out to be of the greatest use when connected with others, and this is what the writers on the science are constantly urging. Their labour has not been altogether the making of bricks without straw, but their allowance of materials has been so scanty that it may be boldly said that, as regards India and China at least, (where I am best informed) their work would have been ten times more complete if they could have obtained materials which within the last thirteen years have been at hand but withheld from them!

**Mr. Severn.**—But, Sir, there must have been a great deal of information furnished to afford materials for what has been done.

**Helmsley Senior.**—Yes, but of this the largest part has only been obtained by a series of repeated requesting, and almost beseeching, which no one who did not know the details could possibly conceive. Some of the instances have been published and are amusing. Here is one of them, in answer to a second or third note written to obtain a log. "Sir, I received your note, but have not time to attend to such trifles. But if you call on board the ship, in all probability the mate will allow you to see it!"

In another instance it is stated that of eighteen ships lying at one time in the harbour of Port Louis at the Mauritius, every commander

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such a science should not be neglected by them as it has hitherto been. For such supineness is a disgraceful neglect of their highest interests, and of one of their most sacred duties. What would Englishmen say to a foreign power which should fail to furnish the lights to a light-house gratuitously built up by poor, but zealous, men for the benefit of the whole world? The science itself must be true or false. Even were it as false as it has been shewn to be true, nothing but advantage can result to human knowledge in general from the facts which it has already registered and from those which it will in future bring to light. If it is true, it is utterly incomprehensible that ENGLAND, the first naval power in the world, should, with such knowledge within its grasp, allow a vast amount of property to be put in peril, and hundreds and thousands of the best and bravest of her children to be annually consigned to suffering or to death, just as the chance may turn out: And this while exposing her taxed mercantile and shipping interests to the fierce rivalry of free trade! She has sympathy for the Negro, the Miner, and the Factory child, and she maintains a petty war force to protect the one, and a staff of Commissioners and Inspectors to watch over the others. One may well ask, in grief and shame, if she has none for her sailors and sailor-boys? Farewell.

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